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SUPPORT NETWORKS OF "EDUCATIONAL PIONEERS": A METHODOLOGICAL APPROACH FOR EXAMINING THE IMPACT OF A RESIDENTIAL LEARNING COMMUNITY ON FIRST-GENERATION STUDENTS

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SUPPORT NETWORKS OF "EDUCATIONAL PIONEERS": A METHODOLOGICAL APPROACH FOR EXAMINING THE IMPACT OF A RESIDENTIAL LEARNING COMMUNITY ON FIRST-GENERATION STUDENTS

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Education in the
College of Education
at the University of Kentucky

By

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ABSTRACT OF DISSERTATION

SUPPORT NETWORKS OF "EDUCATIONAL PIONEERS":
A METHODOLOGICAL APPROACH FOR EXAMINING THE IMPACT OF A RESIDENTIAL LEARNING COMMUNITY ON FIRST-GENERATION STUDENTS

The purpose of this study is to demonstrate the use of social network analysis to examine the peer involvement and supportive relationships of students living within an exclusively first-generation RLC. Using network surveys targeted toward a first-generation population, the networks of first-year residents were visualized and measured. The supportive peer relationships that provided students with encouragement, validation, and academic assistance were identified, as well as the networks for friendship and study partnership. The networks identified for this study were examined to find if change occurred between the start and the end of the semester. Multiple regression QAPs were performed to explore if the RLC's social programming displayed an association with the network ties students formed at the end of their first semester. The results of these analyses are presented, in addition to recommendations for future research studies and evaluations. This study indicates that first-generation RLCs can gain a great deal of information about their students' social involvement using social network analysis techniques, as well as investigate if students are acquiring support from peers as intended.

KEYWORDS: Social Network Analysis, first-generation college students, residential learning communities, college student development, educational evaluation

R. Renee Setari

April 13, 2017

Date

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By

Ryan Renee Setari

Kelly D. Bradley
Director of Dissertation

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April 13, 2017
Date

For Anthony

"[She] looked down on him and felt a self-crushing love. So her soul crawled out from its hiding place."

- Zora Neale Hurston, *Their Eyes Were Watching God*

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CHAPTER I:

Introduction

Student attrition has been a longstanding concern for higher education, with most institutions failing to graduate over 40% of their students within six years (Raisman, 2013; Woosley & Shepler, 2011). Attrition is disconcerting not only because students are not reaching their higher education goals, but also because it causes institutions to lose vital income. To illustrate, for the academic year 2010-2011, the loss of students is estimated to have collectively cost universities nearly $16.5 billion in future revenue (Raisman, 2013). Therefore, to mitigate the financial burden of attrition and improve students' persistence to graduation, institutions have invested in more student support services for undergraduates (Ryan, 2004; Thelin, 2011).

Efforts to support student persistence have been particularly targeted toward first-generation college students. First-generation students are those whose parents have not entered postsecondary education nor obtained a college degree, and thus have been described as the "educational pioneers" of their families (Lohfink & Paulsen, 2005; London, 1996). These individuals account for a large portion of higher education's attrition, as research has found that only 43% of these students persist to a degree, compared to 68% of continuing-generation students, who had at least one parent finish college (Chen & Carroll, 2005; Petty, 2014). Thus, these students are more likely to have fewer opportunities and less lucrative employment. This attrition issue has been previously connected to this group's limited preparation and poor adaptation to higher education (Choy, 2001; Tinto, 2006). Research also indicates that first-generation students are vulnerable to dropping out because they lack support for their educational

aspirations (Lohfink & Paulsen, 2005; Terenzini et al., 1996). Therefore, many colleges and universities established programs directed toward cultivating an informative and supportive environment for this subpopulation (Inkelas et al., 2007).

One of the more recent strategies for supporting the first-generation students' persistence is the development of residential learning communities (RLCs; Inkelas et al., 2007; Johnson, 2000; Stassen, 2003). RLCs are residence halls centered on specific academic goals, and often require participating students to live within the same dormitory, join in shared out-of-class experiences, and attend courses together (Johnson, 2000; Schein, 2005). Numerous colleges and universities have established RLCs because these programs are designed to cultivate peer relationships, which research describes as key to college transition (Inkelas & Weisman, 2003; Tinto, 2006). Although literature regarding RLCs is limited, researchers are optimistic that these programs can help first-generation students, as they provide the support needed for college success (Inkelas et al., 2007).

First-generation RLCs aim to help students overcome their limited college preparation by facilitating social involvement amongst peers. Heavily informed by the works of Tinto (1987), Astin (1975), and other college student development theorists, these communities anticipate that students will provide one another with the information, aid, and understanding needed to overcome the challenges of integrating into the unfamiliar postsecondary realm (Garriott et al., 2011; McCarron & Inkelas, 2006; Thayer, 2000; Woosley & Shepler, 2011). Presumably, cultivating a network of peers will help students commit to finishing college. In addition to the theoretical backing, the establishment of first-generation RLCs has been backed by findings that peer support is a

strong determinant of first-generation students' intent to persist (Kuh et al., 1991; Pascarella & Terenzini, 2005; Pike, 1999; Stassen, 2003). Furthermore, RLCs have shown an impact in practice, as participation has been linked to first-generation students feeling more at ease with others on-campus (Inkelas et al., 2007). Therefore, expanding these communities has been recommended as a promising intervention for first-generation students (Inkelas et al., 2007; Tinto, 2006).

Despite the literary support for these communities, two issues must be considered when examining first-generation RLCs. The first issue of concern is the uncertainty of whether students change their social connections within the RLC. These communities are predicated on the belief that residents will increase their peer relationships, which will in turn encourage higher retention rates (Inkelas et al., 2006; Lohfink & Paulsen, 2005; Terenzini et al., 1996). Institutions invest numerous resources in social activities like peer mentoring and off-campus trips to foster peer relationships, as the literature suggests that increased peer relationships will help students (Stassen, 2003; Ryan, 2004). However, few institutions have investigated if these activities help residents, such as less social first-generation students, connect with peers (Armstrong & Hamilton, 2013; Lohfink & Paulsen, 2005). There are few literary examples of how programs can investigate their students' involvement with other. The evaluation techniques modeled in the literature typically do not involve exploring social process and peer relationships, but instead examine summative outcomes like reenrollment or GPA (Frazier & Eighmy, 2012; Smith, 2010). Although these measures inform administrators of the RLC's influence on academic performance, they do not provide formative input for identifying and improving students' peer relationships before they exit the program. Despite the established

importance of peer connections in college, RLCs are left with few tools for exploring change in their residents' relationships, and traditional evaluative methods allow for little opportunity to incorporate peer relationships into program monitoring.

Another cause for concern is that exclusively first-generation RLCs have little ability to assess if their group-targeted interventions are beneficial. The literature surrounding college student development expresses that housing first-generation students exclusively may prevent them from socializing and acquiring capital because they all are unfamiliar with the college environment (Lohfink & Paulsen, 2005; McCarron & Inkelas, 2006; Pascarella, Pierson, & Wolniak, 2004). Typically, studies have characterized these students as being singularly focused on maintaining good academic standings, and less willing to expend time interacting with well-adjusted peers (Lohfink & Paulsen, 2005; McCarron & Inkelas, 2006). When students do become involved with others, these first-generation peers may not offer them support because they are struggling themselves. Rather, the peers in the community may communicate that college is an insurmountable challenge (Fischer, 2007; Strassen, 2003; Woosley & Shepler, 2011). Investigating if this occurs within first-generation RLCs would help administrators find if the absence of more sociable continuing-generation students hampers their mission. However, the social outputs of such programs are frequently understudied, and little known if helpful connections are present or lacking within these communities (Inkelas et al, 2007; Lohfink & Paulsen, 2005). Without evidence that exclusively first-generation RLCs expose students to the peer support needed to cope in higher education, some colleges are hesitant to establish these communities (Inkelas et al., 2007).

Given these concerns over a lack of supportive relationship building, institutions of higher education need an instrument and methodology capable of exploring if and how peer relationships change within first-generation RLCs. In addition to helping RLC administrators identify the social changes that occur within their programs', the process should also be formative and provide information that can be used to improve students' experiences before they are beyond the programs' reach. The use of socially-oriented methods and analyses would benefit RLCs because they would explore if the communities are meeting their social outcome goals by identifying whether residents are expanding their peer relationships as hoped, or restricting their social involvement. Therefore, this study will present methods and analyses capable of providing first-generation RLCs and other higher education stakeholders with information regarding the change in students' peer involvement and support relationships. The intent of this demonstration is that the tools and measures discussed here will serve as the basis for RLCs to conduct future investigations into their social environments and collect evidence regarding the social involvement within their communities.

Purpose

The purpose of this study was to develop a methodology for examining the development of peer relationships within first-generation RLCs, and to pilot this process. The study aimed to explore the changes in peer relationships within a first-generation RLC, as well as how involvement with peers and program activities influenced the peer support students acquired. The results informed recommendations for the continued development of RLC program processes for the greater benefit of first-generation residents. Therefore, this study demonstrated for higher education administrators the

methods and analyses that will provide formative information about first-generation RLC students' supportive peer relationships, which are conducive to persistence.

This study expanded upon previous research by specifically focusing on an exclusively first-generation RLC (Inkelas et al., 2006; Smith, 2015; Wottenberg, 2014). The survey items used and the analyses conducted were done with particular attention to the challenges and needs related to being first-generation. In addition, this study was distinct in that the outcomes of interest were students' supportive peer relationships, rather than their achievement or cognitive development. This study examined if the community experienced changes in peer support in the form of validation, encouragement, and academic assistance, which have been described as determinants of first-generation persistence (Cabrera, Nora, & Castaneda, 1993; Pascarella et al., 2004). Furthermore, this study examined if exclusively first-generation peer involvement and RLC program activities (e.g. friendship, study partnerships, classes, and events) had a discernable influence on the valuable support networks that help students stay enrolled in college. Thus, this study helped to increase understanding of how first-generation students interactions change during their first year of college, and provides additional precedent for examining the social outcomes of RLC students.

This study was informed by student involvement theory (Astin, 1999) and social network theory. Student involvement theory is an appropriate framework, as it anticipates that differing degrees of social interaction, such as increased friendships, lead to differing outcomes. Using this theoretical backing, this study created an instrument to identify the number and type of relationships that exist amongst residents of RLCs, and secondary information was collected regarding levels of program participation. This data was used

to examine how peer involvement amongst first-generation residents related to change in the supportive relationships. Social network theory also aided the data collection and analysis because it conceptualizes relationships as the primary level of analysis (Scott, 2013). This theory anticipates that the peer relationships are quantifiable as networks, which have a discernable structure that will enlighten how the RLC functions as a whole (Borgatti & Halgin, 2011). Social network theory provided the means to describe the network structure and provided the mathematical backing for calculating network measures. Student involvement theory and social network theory were crucial to understanding how the students' peer relationships change during participation in the RLC.

Given that this study explored peer relationships, social network analysis (SNA) acted as the primary mode of analysis. SNA was appropriate for this study because it is intended to address social linkage patterns, such as business partnerships, kinships, friendships, and other types of relationships (Borgatti, Everett, & Johnson, 2013; Scott, 2013; Wellman & Berkowitz, 1988). SNA is capable of representing the social network existing within the RLC by identifying the peer relationships of interest, such as friendships. These techniques also showed how the structures of the RLC students' network have changed since they matriculated into the program, such as shifts in who studied together and growth in the number of connections. In addition to visually depicting the network of peers within the RLC, SNA provided a means to measure and describe how students' relationships related to other peer network factors and individual attributes in a manner more appropriate for interdependent data.

Research Questions

This study was designed to develop and test a process of examining the development of peer relationships within first-generation RLCs, as well as provide a framework for describing the social outcomes occurring within such communities. The methodology used was intended to be a model for RLC administrators and institutions of higher education looking to incorporate students' relationships into outcome evaluations. In order to provide a first-generation RLC with valuable information about residents' social outcomes, this study answered the following research questions:

1) How do first-generation RLC students' friendships and study partnerships change during the first semester of enrollment?
2) How is participation in RLC programming associated with the end-of-semester friendships and study partnerships of first-generation students?
3) How does the structure of supportive peer networks change during the first semester of enrollment?
4) How is participation in RLC programming and involvement in friendships and study partnerships associated with residents' supportive peer relationships at the end of the semester?

The questions were answered with data collected from network surveys of the RLC residents' and the administrator records. The first research question is directed toward concerns of whether first-generation students increase their social interactions while living in the community, and was answered by comparing residents' degree, betweenness centrality, and homophily, as well as the network density, of friendships and study partnerships from the beginning and end of their first undergraduate semester. The second research question verified to what extent participating in the RLC's activities

were associated with changes in peer relationships. Relational data, as well as demographic data and secondary data measuring individuals' program participation, were analyzed with multiple regression QAP (MR-QAP) to address this question. The third and fourth research questions deal with apprehensions that the first-generation RLCs may not provide students with the peer support needed for persistence. This question was answered by identifying the relationships that provide students with encouragement, validation, and academic assistance. For these networks of support, residents' degree, betweenness centrality, and homophily, as well as the network density, were compared from the beginning and end of the semester. To answer the fourth research question, the supportive relationships served as the outcome variable in a MR-QAP model that included residents' program participation, friendships and study partnership ties, and attribute data. Answering these research questions aimed to provide first-generation RLCs with a template for developing and interpreting measures of social involvement and supportive relationships, which then can be used in future efforts to investigate program effectiveness.

This study proceeded with the conjecture that the Prime Scholars students on average would experience increases in friendship, study partnership ties, and supportive peer relationships between the beginning and the end of their first semester, and these relationships would become more cohesive. Participation in the RLC programming was also anticipated to have a positive impact on students' relationship ties, as participation puts students into more contact with others. Further, this study anticipated that students' friendship ties and study partnerships would positively predict the supportive peer relationships at the end of the semester.

Contribution

This study contributes to higher education by creating a formative evaluation process that colleges and universities can use to examine social outcomes of first-generation RLCs. The instrument created for this study did not exist previously, and the summative evaluation tools typically used do not account for the unique social needs of first-generation students. Therefore, first-generations RLCs suffer from a dearth of information when attempting to make improvements. The procedures developed will alleviate this issue by allowing universities to target and observe the social involvement of first-generation students during the course of the program, which will provide the opportunity to make formative adjustments to increase positive outcomes. Ideally, use of this process would lead to greater retention rates for first-generation students in the long-term.

This study also contributes to education research by providing a methodology for examining the peer networks of first-generation students, which will help student service programs better understand the adaption of this often-overlooked group. This study's instrument was designed specifically to measure the relationships relevant to first-generation students' needs, and could be used as a part of other studies focused on the socialization of this population. Considering the importance of social support for retaining first-generation students, widespread analysis of social networks could be vital for identifying additional challenges to first-generation success and uncovering means of improving their experiences. Future research could build upon what will be discussed here to develop a more comprehensive and holistic model of student development for

first-generation students, whose experiences have long been obscured by continuing-generation students in the literature.

While the peer networks analyzed by this study are those believed to support the college of persistence of first-generation students, other types of RLCs could make use of the methodology demonstrated. While RLCs with general or major-specific enrollment may not explicitly work to build relationships that foster encouragement, validation, and academic assistance, these other communities would likely want to see these types of connections amongst their residents. This study's methodology could be incorporated into the evaluation of non-first-generation RLCs to capture how students fair at developing supportive networks within their programs. Moreover, the instrument and procedures could be used with many other student service programs interested promoting support through peer relationships, such as honor societies, remedial courses, or international student organizations.

Assumptions and Limitations

This study was bound by several assumptions. First, given the focus on peer relationships and the analyses used, the participants and their actions are presumed to be interdependent and influenced by others (Scott, 2013; Wasserman & Faust, 1994). Thus, if an individual's actions were the result of entirely autonomous motivations, then this was not be captured in the findings. Further, as the data collected was presumed interdependent, the findings of the study are limited by any missing data because the missing responses of one subject affects the data associated with another. Second, the peer network examined was limited to the boundaries of the participating RLC, and only considered the ties between residing first-year students. The SNA techniques operated

under the assumption that relationships with those outside the RLC did not impact the peer network (Wellman & Berkowitz, 1988). Finally, this study only intended to track the presence of positive interactions. Negative linkages (e.g. avoidance, dislike, rivalry) were not considered when analyzing the structure of the network, as the student involvement theory only accounts for the presence or absence of positive peer involvement (Astin, 1999; Wasserman & Faust, 1994).

Conclusion

This chapter introduced the concerns associated with residential learning communities (RLCs) exclusively for first-generation college students, and the present need to determine the impact of these programs on the peer relationships of these students. The purpose of this study was presented as to develop and test an instrument and methodology that will aid in evaluating how RLCs influence the peer relationships of first-generation students, and if these relationships are conducive to supporting persistence through college. Social network analysis (SNA) was also introduced as an ideal mode for evaluating the effectiveness of these RLCs, and the advantages of the proposed design were described. The subsequent chapter will provide a review of the literature surrounding first-generation student development, student persistence and retention, and SNA usage in educational research.

CHAPTER II:

A Review of the Literature

This study was supported by research literature spanning multiple fields. This review of the literature includes a discussion of the informative, but limited, work on first-generation students and their retention issues. The literature concerning the various student development theories and their application to first-generation students is summarized, and the theoretical framework of this study is introduced. This chapter also discusses residential learning communities for first-generation students, as well as the role peer relationships play in helping students stay enrolled. Continuing the focus on student relationships, social network theory and social network analysis (SNA) are introduced, and examples of social network research in higher education research are given to demonstrate the appropriateness of these methods for this study.

First-generation Students

Traditionally understudied and underserved, first-generation students have captured more attention during the past decade (Gofen, 2009; Lohfink & Paulsen, 2005; Wang & Castañeda-Sound, 2008). After experiencing growth in college presence throughout the 2000s, these students are estimated to represent between 40% and 50% of the undergraduates enrolled in postsecondary education, and the research on this population has grown accordingly (Chen & Carroll, 2005; Choy, 2001). However, despite heightened interest in the topic, experts have yet to settle on a definition for "first-generation college student." While some describe first-generation college students as those who are the first in their family to matriculate into college (Pascarella et al., 2004; Woosley & Shepard, 2011), others define this group as those whose parents have not

obtained a college degree (Hertel, 2002; Ishitani, 2003; Stephens, Hamedani & Destin, 2014). The latter tends to be preferred as it is more inclusive (Inkelas et al., 2007). First-generation students are not only defined by their parents' educational achievement, but also by their diversity in comparison to other college students. These students are more likely to be female, belong to an ethnic minority group, and be from a low-income background (Inkelas et al., 2007; Saenz et al., 2007). The increased diversity of higher education is much indebted to the surge of first-generation students entering college (Thayer, 2000).

Generational status is important to understanding students' college experiences because research has established that parents' educational obtainment influences the likelihood of being successful in college (Pike & Kuh, 2005; Terenzini, et al., 1996). First-generation students are more likely than their continuing-generation peers to drop out of higher education (Choy, 2001; Pike & Kuh, 2005). Previous research found that only 23.5% of first-generation students enrolled in college persist to a degree within four years, and they are much more likely than their continuing-education counterparts to leave during their first year (Chen & Carroll, 2005; Ishitani, 2003). Even after controlling for other potential mitigating characteristics, such as race and socioeconomic status, research has found that generational status still impacts students' likelihood of persisting to a degree (Choy, 2001; Hertel, 2002).

The challenges faced by first-generation students are not limited to attrition, but also extend to achievement and social involvement. Generational status has been linked to lower scores on college entrance exams, lower postsecondary GPAs, and less beneficial career opportunities (Gofen, 2009; McCarron & Inkelas, 2006; Mehta,

Newbold, & O'Rourke, 2011). First-generation students commonly enter less prestigious institutions, and have considerably lower grades and class rankings than other students (Bowen, Chingos, & McPherson, 2009). These students are also known to be less involved in the social sphere of campus, pursuing few extracurricular activities (Pike & Kuh, 2005). Due to difficulties affording and accessing the important parts of college's hidden curriculum, first-generation students do not gain many of the professional and social benefits that continuing-generation students find through student groups, clubs, and internships (Armstrong & Hamilton, 2013; Lohfink & Paulsen, 2005). These factors associated with generational status suggest that first-generation students face tremendous challenges to staying in college.

First-generation Attrition

First-generation students have been referred to as "educational pioneers" because they undertake the challenges of higher education without the benefit of informed guidance from family (London, 1996). Investigations into the role of generational status in college success have led to various conjectures as to why these "pioneers" are more susceptible to attrition despite already overcoming many challenges. Economic disadvantage may contribute the difficulty of completing college, as the parents of these students do have advanced degrees and have fewer financial resources as a result (Hertel, 2002). Researchers have suggested that this group's attrition is likely intensified by the burdensome costs of college and the limited availability of financial aid (Horn & Nuñez, 2000; Nuñez & Cuccaro-Alamin, 1998). These families are often cannot contribute enough resources to fill the gap left by grant funding, and students are often forced to make up the difference (Bowen, Chingos, & McPherson, 2009; Pascarella, 2004).

Financial need has been linked to students reducing course loads so to accommodate employment, thus delaying their time to graduation (Pascarella, 2004; Pike & Kuh, 2005). Even with employment, many students cannot cope with cost, and either drop out or transfer to less expensive institutions like community colleges (Woosley & Shepler, 2011).)

While limited resources are a credible concern, financial factors do not fully explain the generational differences in student attrition. First-generation students have also displayed considerable under-preparation for college when compared to their continuing-education peers. As published in their work *Crossing the Finish Line*, Bowen, Chingos, & McPherson (2009) found that for students belonging to the same bottom quartile of income-level, those whose parents who did not finish college only scored in the 52nd percentile for precollege math tests, compared to continuing-education children who scored in the 73rd percentile. Parents' education obtainment was also found to influence high school GPAs when other factors were controlled, with children of college graduates scoring considerably higher. This difference in secondary school performance carries into the college, with first-generations students having lower GPAs and class rankings (Bowen, Chingos, & McPherson; 2009). Therefore, this group often has difficulty maintaining acceptable academic standings. They are also more likely to need remedial coursework in order to move on to key core classes, which stalls their college journey and adds additional costs (Ishitani, 2003). Thus, attrition for this group has been linked to students leaving their institutions either because they fail to remain in good academic standing, or because they decide to transfer to less rigorous institutions (Stephens et al., 2012; Terenzini et al., 2006)

In addition to possible financial difficulties and lack of academic preparation, research suggests that first-generation students are inhibited by disparities of cultural and social capital (Collier & Morgan, 2008; Pike & Kuh, 2005; Martinez et al., 2009; Stephens, et al., 2014). Because they are among the first members of their family to experience higher education, these students lack essential knowledge about college life and have difficulty navigating its complex bureaucracies, such as how to acquire financial aid or how to register for courses (Collier & Morgan, 2008; Gofen, 2009; Pascarella et al., 2004). They are also less likely to be aware of how much studying is needed to pass college-level classes, and are more likely to have difficulty choosing a suitable major (Pascarella et al., 2004; Vargas, 2004). Without such cultural capital, first-generation students are left adrift without the information necessary complete tasks. In addition, these students lack social capital in that they know few, if any, people who have completed college; and thus, are less likely than continuing-generation students to have someone they can turn to for help and answers (Oliverez & Tierney, 2005; Vargas, 2004; York-Anderson & Bowman, 1991). Without cultural and social capital to inform their actions or connect them to resources, first-generation students may fall prey to misinformation or fail to meet expectations.

Student development theories and retention. Through the years, various student development frameworks have attempted to explain why first-generation students leave college. Perhaps the most widely referenced framework is Tinto's student integration model (1975, 1987). Tinto's (1975) model proposed that attrition was influenced by formal and informal college experiences, and by how well an individual integrates into the college environment and expectations. Under this conceptualization,

student success is a function of their commitment to the higher education institution, as well as to the educational goals (Demetriou & Schmitz-Sciborski, 2011). Using this lens, integration of first-generation students may be hindered because they know less about campus life, therefore do not feel as connected to the institution or the college experience (Lundberg et al., 2007). Without an affinity for their campus, first-generation students become less committed to staying in the college environment and less likely to succeed (Lohfink & Paulsen, 2005).

Tinto's model has been revised multiple times and has multiple iterations. Over the past three decades, the model has come to include aspects such as the mismatch of students to their institution and motivation's role in goal commitment (Demetriou & Schmitz-Sciborski, 2011). Although, widely used, Tinto's theory has many shortcomings when considering first-generation attrition, such as overlooking the role of generational status and the financial obligations (Cabrera, et al., 1992). Tinto's model has only recently begun to consider the aspects outside of students' control, such as their social origins or access to resources (Tinto, 2006). Therefore, first-generation students are often explored from other perspectives.

Bean (1980, 1982) put forth the student attrition model, which holds that experiences and the institution itself shape the student's attitudes toward college, and thereby affect intent to persist and eventual persistence (Cabrera et al., 1992). This theory emphasizes the importance of understanding students' background characteristics, such as their socioeconomic status and prior academic experiences (Demetriou & Schmitz-Sciborski, 2011). Bean also asserted that students' satisfaction contributed their likelihood of dropping out. Essentially, students leave higher education for many

different reasons, including those outside of their (or anyone's) control (Bean, 1980; Demetriou & Schmitz-Sciborski, 2011). More recently, Bean's model has been revised to consider the role peers play in influencing student satisfaction and student retention (Berger & Lyon, 2005). From this lens, first-generation student attrition is likely a result of college ambitions going unsupported by family and peers, or palpable discrimination by others on campus (Horn & Nuñez, 2000; Terenzini et al., 1996). Thus, they may adopt an attitude that college is not an obtainable goal or believe that no one at the institution will help them, which diminishes their intent to continue.

Student involvement theory. Astin (1999) contributes with his student involvement theory, a model that describes students as undergoing development during their college years (Demetriou & Schmitz-Sciborski, 2011). Astin's student involvement theory forms the theoretical framework of this study, as it accounts for students' background characteristics, their experiences and access to experiences in college, and their attitudes (Pascarella & Terenzini, 2005). This theory holds that the more frequently students become involved with college peers and activities, the more they feel that they belong in the environment and become invested in graduating (Astin, 1999). Differing degrees of social interaction are anticipated to lead to differing outcomes. Thus, according to this framework, first-generation students likely become disengaged from college because they tend to be isolated from the positive influences of peers, faculty, and extracurricular events, and do not reap the benefits of such involvement (Astin, 1993; Martinez et al., 2009).

To improve retention outcomes, this theory holds that first-generation students would benefit from programs that increased their number of on-campus peer relationships

and provided additional curricular and extracurricular opportunities. Astin (1999) also asserted that the peer groups are among the most important, but under-researched influences on students' college success. Who students associate with is just as important as how many people they associate with, because maladjusted peer groups could negatively influence aspirations and goals. Given this theory's focus on event and program participation, as well as its acknowledgement of how peers affect college persistence, student involvement theory is more appropriate for the objectives of this study. However, it is worth noting that, while student involvement theory is distinct, the assumptions of most student development theories are highly complementary and contain consistent elements (Cabrera et al., 1992). Thus, the guidance of this theory may include aspects of other widely used frameworks

Importance of Relationships in Education

Given the importance student development theories place on social interaction, some researchers propose that the attrition of first-generation students may be connected to their relationships (Richardson & Skinner, 1992; Vargas, 2004). Positive social relationships have long been acknowledged as key, but understudied, in education literature (McCabe, 2016). For example, the seminal Coleman Report stated that the success of education is conditional upon a student's social origins and their social groups (Coleman et al., 1966). Researchers have inferred that this statement is apt for first-generation student, as their social groups have less direct knowledge about college, and provide less support and encouragement than the social groups of continuing-generation students (Bradbury & Mather, 2009; Hertel, 2002; Inman & Mayes, 1999; Ishitani, 2006; Terenzini et al., 1996; Thayer, 2000; Volle & Frederico, 1997). As they are often from

low-income backgrounds, first-generation students have fewer friends off-campus who understand their challenges with school and can provide advice (Woosley & Shepler, 2011).

First-generation students not only have difficulty finding friends because they face a smaller pool of people with similar experiences, but also because they face barriers to interacting with others. Financial disadvantage causes these students to avoid social events that would require money or time away for work (Armstrong & Hamilton, 2013). Their unique backgrounds also cause them to have trouble finding peers who relate to their generation-specific struggles, leaving with little commonality on which to base a relationship (Fischer, 2007; Woosley & Shepler, 2011). These obstacles cause first-generation students to seem antisocial when compared to continuing-generation students. McCabe (2016) found that the first-generation students in her study formed fewer friendships, and typically befriended those of similar backgrounds and achievement levels.

With limited friendships, first-generation students report isolating college experiencing (Inkelas et al., 2007; McCabe, 2016; Stuber, 2011). The loneliness arising from limited peer interactions has been linked to anxiety and prematurely exiting higher education (Cacioppo et al., 2000; Mallinckrodt, 1988). Essentially, first-generation students have fewer supportive relationships that reinforce the importance of a degree, alleviate their stress, or make them feel as though they belong in college (Pascarella et al., 2004).

Although few studies have investigated first-generation students' social connections (Dennis, Phinney, & Chuateco, 2005; McCabe, 2016), there is research to

suggest that supportive relationships have a notable influence on student persistence. Students often express a desire for more support from family and friends, even though these relations may offer limited guidance (Mehta et al., 2011). Support from peers has been noted to help successful students cope through the challenges of college (Shields, 2001). Furthermore, the absence of supportive relationships on campus has been linked to negative outcomes for first-generation students (Barry et al., 2009; Dennis et al., 2005; Phinney & Haas, 2003). For example, Dennis, Phinney, and Chuateco (2005) found that the lack of supportive peers on campus predicted lower adjustment, GPAs, and commitment to educational goals, even after controlling for factors such as socioeconomic status and high school GPA. Such findings imply that problems with the aiding and retaining of first-generation students may be somewhat alleviated by fostering supportive relationships within the college setting.

Supportive Relationships and College Persistence

Supportive relationships may help first-generation students succeed because they are sources of social influences conducive to college persistence. Social influences, or social communications that tell another how to feel or behave (Okun, Benin, & Brandt-Williams, 1996), from family and peers are known to influence undergraduates' attrition (Bank, Slavings, & Biddle, 1990). For example, students are more likely to desire their degree when peers repeatedly express support of their aspirations. The Coleman Report implied this to be the case in its assessment of students in lower grades (Cain & Watts, 1970; Carver, 1975; Coleman et al., 1966). Higher education researchers have also suggested that supportive on-campus relationships aid retention because they help students cope with obstacles, making them more resilient (Dennis et al., 2005; Sarason,

Sarason, & Pierce, 1990). The literature has identified that first-generation students particularly benefit from relationships that provide the social influences of validation and encouragement, as well as the resource of academic assistance (Garriott et al., 2015; Nora, Attinasi, & Matonak, 1990; Purdie & Rosser, 2011. These products of relationships have been known to predict college persistence in previous studies, and warrant further investigation.

Encouragement. On-campus friendships and other relationships are probable sources of encouragement, which has been linked to successful social integration into college (Nora et al., 1990). Researchers assume that encouragement leads to increased commitment to completing college, and thereby a greater likelihood of persisting to a degree, because someone else endorses that this goal is obtainable (Cabrera et al., 1993; Strauss & Volkwein, 2004). Thus, encouragement to stay enrolled in college is a powerful factor in an uncertain undergraduate's environment, and has been proposed as having both direct and indirect effects on student persistence (Bean & Metzner, 1985; Okun et al., 1996). Multiple studies on the persistence of students have confirmed that encouragement from family and on-campus peers influences the intent to leave higher education (Cabrera, Stampen, & Hansen, 1990; Nora, 1987; Nora & Rendon, 1990; Okun et al., 1996). Such literary backing has led researchers to include encouragement from family and friends into multiple instruments measuring students' likelihood to continue their education (Okun et al., 1996; Strauss & Volkwein, 2004). Structural models for college persistence and attrition have found encouragement to predict first-generation students' outcomes and academic satisfaction (Cabrera et al., 1993; Garriott et al., 2015). As students, particularly those considering leaving their institution, benefit from

encouragement in their college environment, campuses have made efforts to expose first-generation students to more encouraging experiences (Nicpon et al., 2006).

Validation. Validation from others has been established as vital to first-generation students' adaptation to college (Garriott et al., 2015). Validation is a psychological need fulfilled by social relationships, and confirms that a student is valuable to the campus community and capable of success (Belenky et al., 1986; Terenzini et al., 1994). Students interviewed by Terenzini et al. (1994) reported that validating experiences made them more confident in their choice to attend college. Rendon (1992) also found that validation from peers enabled doubtful students to become more committed to their learning. McCabe (2016) also found that the male first-generation students participating in her study were bolstered by female friends and partners who reinforced that their goals were obtainable. However, without validation, first-generation students are assumed to feel that they are imposters who do not belong in higher education (Barry et al., 2009; Garriott et al., 2015). Often with the additional challenge of being low-income or a minority, these students regularly face disparaging comments from classmates and faculty that undermine their capability to earn a degree (McCabe, 2016). To prevent such counterproductive feelings in this vulnerable student group, researchers have suggested that colleges invest in creating validating social opportunities like peer mentoring and support groups (Mehta et al., 2011).

Academic assistance. College relationships are also assumed to provide academic assistance to first-generation students because social undergraduates tend to have higher cognitive functioning and GPAs than those who are more isolated by comparison (Longwell-Grice & Longwell-Grice, 2007; Pascarella et al., 2004).

Intuitively speaking, increased social interactions lead to increased opportunities to connect with students that are more knowledgeable than oneself (Pike, 2008). Moreover, students who are underprepared for the rigors of college can learn how to meet course expectations from their better-adjusted peers (Purdie & Rosser, 2011). Such study partnerships are especially important to first-generation students not only because they are a means of acquiring college-level study habits, but also because they offer an academic safety net. First-generation students know few people who have successfully completed college, and are insecure that they are up to the task alone (Collier & Morgan, 2008). When first-generation students feel that someone is available to help them with schoolwork, that perception alone is associated with a greater likelihood of persistence to a degree (Nicpon et al., 2006). Peer academic assistance has been found to positively impact student persistence in multiple studies (Nicpon et al., 2006; Pascarella et al., 2004; Whitt et al., 1999; Whitt et al., 2001), which has led to colleges incorporating study sessions and peer tutoring into their first-generation intervention programs.

First-generation Intervention Programs and RLCS

As first-generation students present a significant attrition risk, institutions have spent the past two decades seizing upon opportunities to improve their odds of success (Thayer, 2000). To address the financial disadvantage of these students, most colleges offer first-generation scholarship packages. To compensate for limited understanding of college expectations, student support services are now prevalent, and offer advising, extracurricular opportunities, and academic counseling (Thayer, 2000). Given that first impressions of college life heavily influence persistence decisions, most first-generation interventions target the first semester of enrollment (Woosley, 2003; Woosley & Miller,

2009). Popular amongst colleges, summer bridge programs were developed to mitigate first-generation students' academic shortcomings in the weeks before the first fall semester (Kezar, 2000). Institutions also utilize orientation seminars to familiarize students with expectations and protocols at the start of the academic year (Stephens et al., 2014). These interventions have proven successful, and expansions have been widely recommended (Terenzini et al., 1996). However, multiple studies indicate that these popular interventions do not account for first-generation students' unique psychological need for social support, and thus, do not reach their full potential (Oysterman & Destin, 2010; Rendon, 1992; Stephens et al., 2014; Stephens et al., 2012).

Some institutions have transitioned to difference-education intervention to meet students' early needs for peer support (Gurin & Nagda, 2006; Gurin, Nagda, & Zuniga, 2013). Based on multicultural higher education research, difference-education interventions involve participants sharing their unique adaptation experiences with peers in order to help others feel validated and encouraged (Stephens et al., 2014). After participating in such programs, at-risk students have exhibited increased feelings of support and empathy toward peers (Gurin et al., 2013). For first-generation students, difference-education interventions led to higher GPAs, more access of campus resources, and greater social engagement compared to standard orientation programs (Stephens et al., 2014). Additional studies have implied that the support provided by these programs help first-generation students to enjoy and commit to their institution (Stephens et al., 2012). The bolstering effect of empathetic peer support networks is thought to be the source of these results, as they allow students to be more resilient to stress and setbacks (Nicpon et al., 2006).

Residential learning communities. More recently, higher education literature has suggested that residential learning programs are another beneficial intervention for first-generation students (Inkelas et al., 2007). Residential learning communities (RLCs), also known as living-learning communities (LLCs), are specialized residence halls that incorporate specific academic themes and maintain limited residency (Mehta et al., 2011). These interventions have become popular additions on campuses, with over 800 RLCs active throughout the country (Smith, 2015; Smith & MacGregor, 2009). RLCs are influenced by theory and research emphasizing that on-campus housing eases students' transition into college (Tinto, 1987; Zhao & Kuh, 2004). However, these programs expand on this idea by aiming to facilitate effective academic and social integration through merged curricular pursuits, and by building beneficial social relationships amongst peers (Inkelas et al., 2007; Shapiro & Levine, 1999; Smith, 2015). There are several different categories of RLCs, which focus on different subsets of students and academic goals (Smith, 2015). Commonly, these communities promote collaborative learning by requiring residents to attend classes together and participate in socially-oriented programming (Inkelas & Weisman, 2003; Inkelas et al., 2007).

These programs have demonstrated promising results for the students that they serve. Studies have shown that freshman students participating in RLCs had higher GPAs and better cognitive outcomes than peers who participated in other first-year experience programs (Inkelas & Weisman, 2003; Purdie & Rosser, 2007). Even when the programs are small or have a limited intervention, they have been shown to improve the participants' academic persistence (Stassen, 2003). However, other studies have shown these programs to have mixed results (Pascarella & Terenzini, 2005; Smith, 2015). Some

researchers presumed that such communities cause the participants to be too dependent on their fellow residents' opinions, and lead them to replicate negative behaviors (Beachboard, Beachboard, Li, & Adkison, 2011). The source of positive and negative outcomes may be rooted in the students' social integration; however, little is known about how students become integrated and connect with others within these communities (Pike, 1999). More investigation is needed to determine the social aspects of RLCs influence students' outcomes (Pike, 1999; Pike, Kuh, & McCormick, 2011; Smith, 2015).

RLCs are not usually designed around residents' generational status, but multiple researchers have conjectured that these communities will improve the persistence of first-generation students (Inkelas, et al, 2007; Pasque & Murphy, 2005). RLCs have been shown as more apt than traditional residence halls to make students feel supported (Stassen, 2003). Zhao and Kuh (2004) found that RLC residents perceived their campus as more receptive to their social needs, and as a more satisfying place to learn. In Wawrzynski and Jessup-Anger's study (2010), students reported learning community residence halls as more validating and better sources of academic assistance than other dormitories. RLCs have a record of connecting residents to more peers, which leads to friendships and study partnerships that reduce the likelihood of failing out of college (Stassen, 2003). Very few studies have actually tested if first-generation students thrive in RLCs. However, some evidence suggests these students display better than typical academic and social outcomes following residency in RLCs, such as uncharacteristically high levels of peer interaction (Inkelas et al., 2007).

Exclusively first-generation RLCs are a recent development in higher education that essentially uses the learning community design to expand upon difference-education

interventions for first-year first-generation students (Inkelas et al., 2007; Stephens et al., 2014). Rather than drawing in residents from various backgrounds and revolving around an academic theme, these programs limit their residency to only first-generation (and often first-year) students, and focus on promoting on-campus participation and academic enhancement. These RLCs work to mitigate the issues associated with students' social origins, as they house the student on-campus and apart from social groups that may not foster persistence (Coleman et al., 1966; Cain & Watts, 1970). By encouraging the students to remain in an environment focused on college success and shared challenges of being first-generation, these communities are theorized to insulate students from the influences that are not constructive or empathetic (Cain & Watt, 1970; Inkelas et al., 2007; Stassen, 2003). Inkelas et al. (2007), as well as Stephens et al. (2014), recommended the expansion of first-generation RLCs because these programs will be more attuned to this student group's need for encouragement, validation, and other forms of social support from peers. However, these RLCs face criticism for sequestering first-generation students into the same residence, and thereby limiting their contact with better-informed continuing-generation students. Residents of selective enrollment RLCs report less exposure to diverse ideas than residents of traditional dorms (Stassen, 2003). Residents of first-generation RLCs may not be able to find academic assistance or encouragement within such a homogenous group of peers, as first-generation students tend to be low achieving, less social, and less likely to view college as an obtainable goal (Choy, 2001; Dennis et al., 2005; Terenzini et al., 1996; Nicpon et al., 2006).

First-generation RLCs face many challenges to showing that they help meet students' need for supportive peer relationships. First, as mentioned earlier, research on

the effectiveness of RLCs is extremely limited; and due to the variety in program designs, most of the findings are not generalizable to models used for first-generation students (Stassen, 2003). Second, few studies include social variables in their analyses, leaving limited research concerning their impact on peer interaction or the development of support networks (Inkelas et al, 2007; Smith, 2010; Zhao & Kuh, 2004). Thus, stakeholders of RLCs have few peer-reviewed findings to support their assumptions that program activities bolster social integration and foster supportive peer relationships. Third, there is evidence suggesting that modest nonresidential learning communities achieve similar cognitive outcomes as more expensive RLCs (Stassen, 2003). Thus, more research and evaluations must be undertaken to investigate if first-generation RLCs warrant their expense, and to understand what can be done to support the retention of first-generation students.

To understand the effect of such interventions on retention, first-generation RLCs and their administrations would benefit from exploring the development of peer networks within their communities. Astin (1999) claimed that a student's peer group was one of the greatest predictors of college success, yet is notably understudied. Despite the common assertion that students' social environment and non-cognitive experiences play an integral role in eventual persistence (Astin, 2002; Bean, 1980; Pike, 2008; Tinto & Russo, 1994), most studies and evaluations of learning communities only assess their process and outcomes via cognitive measures (Inkelas et al., 2007; Pasque & Murphy, 2005; Pike, 1999; Pike et al., 1997; Wawrzynski & Jessup-Anger, 2010). The overemphasis on cognitive outcomes does not provide RLCs with enough formative information about their students' progress, as these communities pursue social goals. RLC programs intend

for their residential designs to link residents with one another through comradery and shared experiences, thus allowing them to develop a network of support that will help to persist to graduation (Inkelas et al., 2007; Wawrzynski & Jessup-Anger, 2010). However, without attention to whether students' peer involvement is changing, or examining whether students support one another, it is difficult for the communities to assess if they are progressing toward their goals and providing first-generation students social experiences that will help them succeed. To address these concerns, network analysis has been recommended for the study of social involvement and integration in college (Smith, 2015; Thomas, 2000). Thus, the subsequent section introduces social network perspectives and approaches for examining students relationships, which will help address RLCs' need for socially-oriented evaluation procedures.

Social Networks

This study is designed as a demonstration of social network analysis, and its application for examining the peer involvement and support within first-generation RLCs. Social networks are the interdependent connections and relations that exist within collections of people, and typically are based on kinship, membership, or the exchange of ideas or capital (Scott, 2013; Serrat, 2009; Thomas, 2000). In more mathematical terms, a network consists of a set of nodes (usually individuals, or "actors") and the defined relationship that connects these nodes (Kadushin, 2012). The simplest form of network, which is displayed in Figure 1, is a dyad comprised of two nodes and the connecting relationship, or tie, which exists between them.

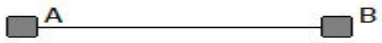

Figure 2.1. Dyad Connected by Undirected Tie.

These ties can be without direction, such as affiliation, biological relation, or standing in a room together, where the relationship is associated with a state of being and the nodes inherently reciprocate (Kadushin, 2012; Borgatti, Everett, & Johnson, 2013). Other times, the ties are directional like that shown in Figure 2.1, where the connection shows a "flow" from one node to another that is not necessarily reciprocated (Kadushin, 2012).

Figure 2.1. Dyad Connected by Directed Tie.

Quantifying and measuring these networks has long been pursued by sociological research, as these ties are assumed to dictate an individual's actions and beliefs (Thomas, 2000; Wasserman & Faust, 1994). Therefore, if colleges wish to set their students up for success, then having an understanding of the networks that affect students' behaviors would be invaluable (Antonio, 2004).

Social Network Theory

The examination of social networks is guided by social network theory (Scott, 2013). Social network theory is not a singular theoretical understanding, but rather is a sociological and mathematical approach that focuses on the manner in which people are connected, instead of the people themselves (Adler & Kwon, 2002; Borgatti & Halgin, 2011). To explain particular phenomena, social scientists have extrapolated multiple iterations that serve as the foundation of social network theory, such as Granovetter's (1973) strength of weak ties theory, Burt's (1992) structural holes theory, and social resource theory (Lin, Ensel, & Vaugh, 1981). Although it may differ in specification, name, and approach, social network theory consistently works to explain network structures and their effect on outcomes (Borgatti & Halgin, 2011). The expansion of social network theory and the exploration of social networks contributed greatly to several fields of study (Thomas, 2000).

The primary maxim of social network theory is that the structure of a person's social environment can be identified as a network, which is important to understanding current and future events or characteristics (Borgatti et al., 2009; Borgatti & Halgin, 2011). Furthermore, networks can be characterized and measured through the mathematical principles that form the backbone of social network theory and analysis (Freeman, 1979). With origins in graph theory, social network theory guides researchers in quantifying and visualizing the structure of relationships through a series of mathematical operations (Akers, 2011; de Laat et al., 2007). These mathematical calculations can also serve as the basis for further investigation or theorizing (Borgatti & Halgin, 2011; Freeman, 1979).

Unlike most other social science theories, social network theory is not reductionist, as it seeks to use the individual's connections and attributes to explain a larger encompassing structure (Kadushin, 2012). Such attention is placed on larger social structures because social network theory holds that individuals' positions within their social context determines how they influence and are influenced by others, which affects behaviors, experiences, and characteristics throughout the network (Wasserman & Faust, 1994). Although descriptive, network theory should not be viewed as an exploratory methodology (Borgatti, Everett, & Johnson, 2009). Rather, the theory is a complex approach by which researchers can better understand the transfer of information, rises in power, and basis of relationships (Borgatti, Everett, & Johnson, 2009).

Social Network Analysis

Social network analysis (SNA) is a methodological strategy based on social network theory, and associated with the identifying, visualizing, and measuring the structure of the social networks of individuals (Borgatti, Everett, & Johnson, 2013; Otte & Rousseau, 2002; Scott, 2013). SNA aims to determine how people are influenced by others by examining patterns in the network ties (Granovetter, 1973). SNA begins by quantifying ties into vectors where a number represents the type or strength of a relationship (Kadushin, 2012). These vectors are used to form a matrix of rows and columns that represent each person belonging to the defined network, and each cell within this matrix shows the nature of the tie between two actors (Borgatti, Everett, & Johnson, 2013; Kadushin, 2012; Scott, 2013). An example of such a matrix is displayed in Table 2.1.

Table 2.1.

Matrix displaying a binary, symmetrical relationship

	Dana	Fox	Walter
Dana	-	1	0
Fox	1	-	1
Walter	0	1	-

In this example, the relational data is binary, where the value of 1 in a cell indicates that a relationship exists for the dyad, while the value of 0 means it is absent. Values within such matrices allow researchers to calculate the size of a person's network, her popularity, and even her importance when combined with complex algebraic techniques, which will be detailed in Chapter III (Thomas, 2000). Using the algebraic calculations of the matrix data, SNA produces numerous mathematical measures to characterize the population involved (Freeman, 1984). These measures, which include network density, centrality, and others that will be discussed later in the Chapter III, can be used to answer most research questions about organizations.

Visualizing social networks. In addition to providing structural measures, SNA can provide graphic representations of networks, known as sociograms (Scott, 2013). Sociograms make "invisible" systems of connections visible and measurable (Wasserman & Faust, 1994; Scott, 2013). An example of a sociogram for a one-mode network can be seen in Figure 2.2.

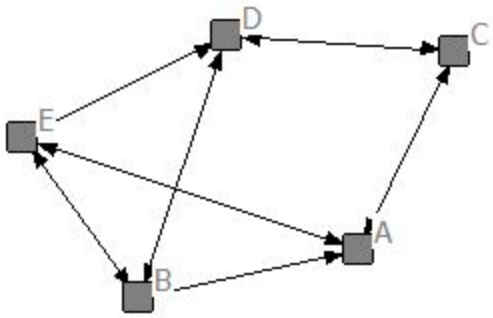

Figure 2.3 One-mode Directed Network with Reciprocal Ties

From Figure 3, those less familiar with interpreting mathematic outputs can observe that node C is does not interact with, and is thereby distant from node B and E. Sociograms are valuable because they aid in identifying network characteristics of importance (Borgatti et al., 2013). Less abstract than the mathematical measures yielded in SNA, the sociograms allow the stakeholders of organizations like RLCs to see the invisible social processes at work, and pinpoint areas of concern. Such products of SNA have been described as potentially invaluable to the study of college peer culture because they can delve further into students' peer relationships, which may be the key to operating successful student retention programs (Astin, 1999; Thomas, 2000). Due to their potential, these techniques are gaining more notoriety in the study of education programs, as they are more apt than traditional evaluation methods to examine how social context influences participants experience in a program (Akers, 2011; Daly, 2010; Scott, 2013).

Distinctiveness of SNA. SNA is better suited to explore the social contexts of programs because it is primarily concerned with relationships (Wasserman & Faust, 1994). This is unlike most social science analytical methods, which tend to prioritize characteristics and behaviors of individuals. Because, SNA focuses on how people are

connected rather than how they are different, these analyses assume that all actors in a network are interdependent and unavoidably influence one another (Kadushin, 2012). Of course, this goes against the assumption of independence, which is vital to inferential analyses such as OLS regression (Scott, 2012). However, this deviation allows SNA to be ideal for interpreting relational data, which is interdependent by definition. Relational data is information regarding affiliation, contact, sharing, and other types of relationships that involve at least two people (Scott, 2013). Although the individual-level attribute data is used to strengthen social network analyses, the main focus of SNA is how individuals relate to one another, which allows this strategy to investigate complex social structures in a way that is beyond traditional social science (Wasserman & Faust, 1994).

Social Network Analysis in Education

Since the 1970s, SNA has expanded out of the fringes of sociology, and has become a common tool in psychology, epidemiology, and various other fields (Borgatti et al., 2013; Scott, 2000). However, SNA remains an underutilized tool in education research, particularly for the evaluation of programs and interventions with social goals (Akers, 2011). Generally, education programs use questionnaires, observations, and interviews examined by traditional social science analyses to determine if social objectives are being met (de Laat et al., 2006). The difficulty with using these methods is that they can be time-consuming and expensive for some programs. Moreover, these methods are not suited for examining the outcomes associated with a network of interdependent actors in a shared context, but rather as a grouping of independent entities (Thomas, 2000). These methods do not show patterns in how participants or facilitators

collaborate toward a common goal, which is vital to assessing most education programs (de Laat et al., 2007; Valente et al., 2015).

Given its relational perspective, SNA has been described by some educational researchers as a more appropriate approach for socially oriented program evaluations (Durland & Fredericks, 2005). De Laat et al. (2007) assert that SNA easily describes patterns in program participation, and learning communities can be straightforwardly studied as whole networks. Calvó-Armengol and Patacchini (2009) defended their use of SNA in the study of peer effects in higher education by relating that students are not educated in a vacuum, but rather their learning is dependent on their friends, family, and instructors. Considering this, they conceptualize that the dyad is natural unit of analysis in these situations, and examinations of education should be dyadic in scope. Thomas (2000) demonstrated that SNA could be used to investigate the role of student integration in college persistence, and recommended that the approach be tested with different student populations and contexts.

Aside from Thomas (2000), multiple studies have recently demonstrated the use of SNA in higher education research. For example, Pressman et al. (2005) analyzed if the quantity of social ties impacted students' health and well-being. Calvó-Armengol and Patacchini (2009) found that SNA was better equipped to diagnose critical issues facing an online learning community, and confirmed that students shared information despite physical distance. Previous research on RLC effectiveness has included social network perspectives and analyses. Smith (2011) was able to use network measures derived from SNA, combined with qualitative interviews, to find that participating in an RLC led to changes in students' social networks. Smith (2015) also found that students' network

position had an effect on their GPA, with students who attract friends having higher GPAs than students that seek friends. Thus, examining students' networks found that the community did not benefit all the residents equally. Wottenberg (2014) found that students in an engineering RLC developed close relationships with one another, and the community intended. However, the network structure was not linked to academic performance and did not affect students' GPAs. Although, not performed with first-generation programs, the results provided by these studies demonstrates that SNA could be valuable to investigating if exclusively first-generation RLCs enhance the support students receive, as well as reinforce measures already in used to evaluate these communities.

Conclusion

This chapter provided a review of the literature associated with first-generation students' college persistence, student development theories, and residential learning communities. The theoretical framework guiding this methodological study was also outlined. An overview of social network analysis was given to explain the appropriateness of the approach for examining peer relationships in RLCs, and previous work applying SNA to educational research was described. The next chapter will describe the research design for the present study, and will detail the methodological application of SNA for investigating peer support networks in a first-generation community.

CHAPTER III:

Methodology

This chapter begins by restating the purpose of the study, significance, and research questions. This chapter describes the program site, the anticipated sample, and the data collection method. Additionally, this chapter discusses the variables of interest for the study, the analyses that will be conducted, and how these analyses will answer the research questions posed.

Purpose and Significance

The purpose of this study was to develop a social network oriented methodology for the formative evaluation of first-generation RLCs and pilot test it with a sample. Unlike previous research, this instrument and process used in this study were specifically designed to examine peer networks within an exclusively first-generation RLC (Inkelas et al., 2006; Smith, 2011; Smith, 2015; Wottenberg, 2014). The analyses used here display how RLC programs can measure peer relationships to explore if the first-generation students are meeting social expectations. The methodology also explored how peer involvement and participation in the RLC's social programming influences the formation of peer networks centered on encouragement, validation, and academic assistance, which have previously been found to contribute to first-generation students' likelihood to persist (Cabrera, Nora, & Castaneda, 1993). This study is intended to act as a guide for including peer support relationships when evaluating first-generation RLCs, and information about these relationships can be used to revise programs before students complete their first year. Thereby, the products of this study could lead to more effective first-generation

RLCs and a greater understanding of how the peer networks of these students change within such a context.

Research Questions

This study was designed to develop and test a methodology for examining changes in peer relationships within first-generation RLCs. The methodology used was intended to be a model for RLC administrators and institutions of higher education looking to consider students' social involvement during evaluations. In order to provide an archetype for a formative evaluation instrument, this study answered the following research questions:

1) How do first-generation RLC students' friendships and study partnerships change during the first semester of enrollment?
2) How is participation in RLC programming associated with the end-of-semester friendships and study partnerships of first-generation students?
3) How does the structure of supportive peer networks change during the first semester of enrollment?
4) How is participation in RLC programming and involvement in friendships and study partnerships associated with the supportive peer relationships at the end of the semester?

This study proceeded with the conjecture that the SNA methods would not only be able to define and measure the social involvement of the Prime Scholars students, but also would give an indication that residents experienced increases in friendship and study partnership ties on average. Furthermore, these relationships were anticipated to show

signs of becoming more cohesive as the residents continued living together in the RLC. Changes in the number and cohesiveness of ties were presumed because the RLC went through considerable efforts to introduce residents to others. The analytical approaches used for this study, which will be described in greater detail in subsequent sections, were conjectured to indicate whether the participation in the RLC programming predicts degree friendships and study partnerships. Provided that the analyses were capable of indicating the influence of programming on social involvement, this study also assumed that there would be evidence that participation in the RLC programming positively predicts friendships and study partnerships. Similarly, evidence of an increase in supportive relationships was anticipated. Using the perspective of student involvement theory, this study also proceeded with the presumption that the analyses would find evidence that students' frequencies of program participation, as well as friendships and study partnerships, positively predict the supportive peer relationships at the end of the semester.

The Site

Prime Scholars. The RLC selected for this study, which will be hereafter referred to by the pseudonym Prime Scholars, exclusively serves first-generation undergraduate students, and defines first-generation students as those whose parents have not completed a college degree. The RLC is located at a large research university located in the southeastern United States, and was selected because the institution has a large first-generation population with a low graduation rate. The RLC mainly houses first-year students; however, the community does house a small number of students who opted to return for a second year in the program. Most students self-select into the Prime Scholars

program by applying for residence before matriculating for their freshman year. Some residents are required to reside in the Prime Scholars community as a condition of a specific scholarship program that awards need-based aid to high performing first-generation students, which will be referred to by the pseudonym Jacobsen Students. After accepting a year's cohort, the program houses students on the Prime Scholars floors of the residence hall, offers a variety of social and community-engagement events, and provides access to tutoring and mentoring services. In addition to providing academic resources and extracurricular opportunities, the Prime Scholars program includes "connected courses," which are courses designed for the community's first-year residents and connected to the community objectives. However, as this community is not major-specific or academically-themed, the connected courses are not required because the students belong to different programs of study throughout the university.

Prime Scholars aims to increase the university's retention of first-generation students. To reach this goal, the community was designed as a difference-education intervention. The students are sequestered into the same residence to highlight shared experiences and challenges, and the administration provides targeted resources to address these group-specific challenges. Some of the challenges that face the first-generation population at this institution include low-income backgrounds, difficulty meeting college costs, limited understanding of college expectations, and the need to take remedial coursework. In addition, most of these students grew up in rural communities, and have difficulty adjusting to the densely populated urban area that surrounds the campus. To address students' dysphoria with these new circumstances, Prime Scholars intends to create a community of support and understanding amongst peers. Participants are housed

on-campus to prevent disconnect from college activities, and are encouraged to develop friendships amongst themselves so to foster engagement with the social aspects of college. Although the community has academic objectives such as improving the grades and course completion rates of the residents, Prime Scholars has a strong social orientation, as it seeks build a network of support strong enough to catch students before they drop out.

The administration of Prime Scholars has conducted regular program monitoring and outcome evaluations since the establishment of the community. These evaluations consist of comparing the end of year GPAs of the Prime Scholars residents to the GPAs of students living in other residence halls and off-campus, as well as comparing residents' self-reported satisfaction with college to the satisfaction of nonresidents. However, the administration acknowledged that they want to have more indicators that Prime Scholars was helping its first-year residents develop support networks. In the past, the program met resistance because of concerns that limiting the RLC to only first-generation students would impair the social integration of these students. The administrators would like to address whether these students refrain from socializing with others, as some have come to suspect due to the literature. The administrators are also concerned that residing Jacobsen Students, who are recipients of a highly selective need-based scholarship, may be less involved with peers who are not also Jacobsen Students. The RLC's current evaluation tools do not include a means to assess these social involvement issues. To address these needs, I proposed a social network analysis approach utilizing newly created evaluation surveys and a process for determining changes in peer relationship in the RLC.

Sample

Given that this study aims to examine the relationships between all freshman residents within the first-generation RLC, this was a whole network study that aimed to include the entire first-year Prime Scholars population. A whole network design was chosen because this project is concerned with characterizing the pattern of relationships that exist between residents of the RLC, rather describing the individuals themselves. Whole network designs are more common, and they allow for a full range of SNA techniques to be used (Borgatti, Everett, and Johnson, 2013). A random sampling of students was not be used, as network analyses are meant to characterize an entire population rather than a sample. Thus, this study was included the entire Fall 2016 cohort within its target population. Based on the enrollment of previous years, the RLC staff expected at least 70 new residents to matriculate this year and participate in the pilot. However, the incoming cohort numbered 59 residents, which will be discussed further in Chapter IV.

The population was bound to only first-year Prime Scholars residents because the research questions and the RLC administrators were primarily concerned with the experiences and social context of incoming students. Given that this study was concerned with how supportive ties develop amongst students who come into college with few connections, including students outside this population would not be appropriate because they would (presumably) have already established on-campus ties.

Data Sources

Data for this study came from two sources: surveys of all the first-year students belonging to the Prime Scholars community during the fall semester of the 2016-2017 academic year, and secondary data from the RLC administration's resident files. Two

surveys were created to measure residents' relationship within the RLC. To acquire baseline relational data, a voluntary self-administered survey was given to the incoming residents during the finish weeks of the semester. A second voluntary survey was given during the last weeks of the semester to acquire comparative relational data. The surveys were administered online via Qualtrics. The surveys mainly collected the relational data and demographic data needed to answer the research questions. As this was a whole network study, a survey response rate of at least 75% was sought (Borgatti, Carley, & Krackhardt, 2006; Wasserman & Faust, 1994). Multiple waves of survey distribution during the first and last few weeks of the academic term was a strategy to achieve the necessary response rate. Secondary attribute data was also acquired from the RLC's records of student participation. For years as part of ongoing program monitoring, Prime Scholars had consistently recorded which residents participated in events and attended connected courses. Using these files, each participant's frequency of events attendance and enrollment in connected courses were included as variables

Survey. The baseline survey contained nine items. Five of the items were response matrices each intended to collect information about students' relationships. The first two items concerned friendships and study partnerships. The following three items concerned encouragement, validation, and academic assistance, which are forms of peer support that have been previously associated with college persistence (Cabrera, Nora, & Castaneda, 1993; Longwell-Grice & Longwell-Grice, 2007; Pascarella et al., 2004). The matrices included the name of every participant, and respondents endorsed the names of the people with whom they shared the relevant relationship. The matrices were worded in the past tense to establish if students had any preexisting relationships with each other

before coming to the university. Three of the remaining items were multiple-choice and asked respondents to endorse their race, sex, and scholarship status. The last items were open-response, and asked respondents to identify their major and how many friends they have at the university who live outside the RLC. The question about friends outside the RLC will control for the intensity of their ties outside the RLC.

The comparison survey, which served as the basis for most of the analyses, contained nine items. Five of the items were also response matrices intended to collect information about students' friendships, study partnerships, or one of three supportive relationships. The details of the purpose and type of relationship associated with each relational item on the end-of-semester comparison survey are detailed in Table 3.1.

Table 3.1

Details of End-of-Semester Survey Items

Item	Relationship	Directionality	Purpose
Who are your friends?	Friendship	Undirected and symmetrical (if I am friends with you, then you are friends with me)	• Determines if students have become more involved with peers • Serves as independent variable to find if number of friendships is associated with the creation of support networks.
Who usually studies with you?	Study partnerships	Undirected and symmetrical (if I am study with you, then you study with me)	• Determines if students have become more involved with peers by developing more study partnerships. • Serves as independent variable to find if number of study partnerships is associated with the creation of support networks.

Table continues

Table 3.1 continued

Item	Relationship	Directionality	Purpose
Who encourages you to continue attending [institution name]?	Encouragement	Directed, not inherently symmetrical (I provide encouragement to you, but you do not encourage me)	• Determines if students are being encouraged by others to stay enrolled. • Encouragement from peers has been found to be a related to students' likelihood to persist (Cabrera, Nora, & Castaneda, 1993; Strauss & Volkwein, 2004).
Who makes you feel important at [institution name]?	Validation	Directed, not inherently symmetrical (I validate you, but you do not validate me)	• Determines if others are making the student feel that they belong and are important in the college environment. • Validation can be conceptualized as feeling important to others, and has been connected to students having increased resolve to finish their education (Belenky et al., 1986; Terenzini et al., 1994).
When you have trouble with coursework, who typically helps you?	Academic assistance	Directed, not inherently symmetrical (I provide assistance to you, but you do not assist me)	• Determines if students are receiving academic help from each other. • Academic assistance is assumed to help student persist because it helps their cope with and surpass academic challenges (Longwell-Grice & Longwell-Grice, 2007; Pascarella et al., 2004).

The matrices included the name of every participant, and respondents endorsed the name of the person with whom they share the relevant relationship. For the study

partnership and the three support relationship matrices, the items were phrased to describe the relationship in question (e.g. “Before college, who usually studied with you?). For the friendship item, though, friendship was not defined or described because this relationship varies considerably between individuals. Network research commonly leaves the definition of friendship open for interpretation (McCabe, 2016). The matrices also were worded in the present tense to capture ongoing relationships, and determine if students expanded their networks during their first semester of college. Three of the remaining items were multiple-choice and asked respondents to endorse their race, sex, and scholarship status. The last items were open-response, and asked respondents to identify their major and how many friends they have at the university who live outside the RLC.

This means of data collection was chosen because surveys are the most practical way to obtain social network information from an organization of individuals, as they minimize respondent discomfort and is only moderately vulnerable to data handling errors (Borgatti, Everett, & Johnson, 2013; Cross, Borgatti, & Parker, 2002). Moreover, surveys are more cost-effective and straightforward for the RLC to administer and replicate in the future. The surveys were distributed online because this mode is easily accessible and easily returned from multiple locations (e.g. in a dorm room, in a classroom, or in a dining hall). Hard-copy versions of the baseline and comparison surveys can be found in the Appendix B.

Coding relational data. In order to map the peer networks in the RLC, the responses to both surveys were used to establish the existence of social ties between individuals. RLC populations’ collective responses to the relational items were used to

map multiple social networks layered within the Prime Scholars community. To do this the data was managed by coding the responses of each student into a vector in an adjacency matrix for each item, similar to that shown in Table 3.2.

Table 3.2

*Adjacency matrix representing who provides encouragement to whom**

	Student A	Student B	Student C	Student D
Student A	-	0	1	0
Student B	1	-	0	0
Student C	0	1	-	0
Student D	1	1	1	-

*In SNA, the rows typically send information or resources to the columns (Borgatti et al., 2013; Scott, 2013).

The survey responses were dichotomously coded as the respondents only have the option to either confirm a tie with another resident (and the dyad will be coded as "1") or not (and the dyad will be coded as "0"). Any missing responses were managed by using the responses of other participants to fill in the data vectors where appropriate, or were omitted from the analysis, as is the standard for network studies (Scott, 2013). These matrices were the sources of the SNA measures needed to address the research questions. Data from the friendship and study partnership items determined if the residents became more involved with one another after a semester, as the program intended. The data collected from the supportive relationship items served as the dependent variables of this study.

Coding attribute data. In order to determine if residents' supportive peer relationships and peer involvement differ based on individual-level attributes, the survey collected demographic information to be included in the analyses. Three multiple-choice items provided respondents' race, sex, and scholarship status. One open-response item provided respondents' major. This information served as descriptives and independent variables for analytical procedures discussed later in the chapter. To include these variables, each attribute was included as a vector in an actor-by-attribute matrix. An actor-by-attribute matrix consists of rows for the residents and the columns for each attribute. The responses to the multiple choice demographic items were dichotomously coded with a "0" indicating that the student in row *j* does not have the trait in column *k*, and a "1" indicating that the student in row *j* does have the trait in column *k*. For the first open response item, "What is your major?", vectors were included in the actor-by-attribute matrix to represent each college of study. Students' responses were coded as "1" in the vector if their major fell within a discipline of study, and "0" if not. A vector was also included for undecided/undeclared majors. For the second open response item, "How many friends do you have at [institution] who DO NOT live in Prime Scholars?", a single vector was created in the actor-by-attribute matrix, and responses were entered as continuous variables. Any missing responses to the demographic items will be coded as "missing" for the analysis.

Secondary program participation data. In addition to the attribute data collected from the demographic items on both surveys, the study obtained attribute data from the Prime Scholars student records. In past years, Prime Scholars recorded resident participation for all events, as well as who was enrolled in connected courses. The Prime

Scholars participation records and connected class rosters of the entire fall semester for all the first-year students were obtained at the end of the Fall 2016 semester and continuously coded into actor-by-attribute matrix, with vectors indicating the number of events attended and number of courses taken by the corresponding student. These will be coded continuously. This program participation data acted as the primary independent variable for answering the second and fourth research questions. The participating cohort's first-to-second semester college reenrollment rate was also collected from the administrations' records. While this information was not used for the analyses, it was reported for the interest of the readers.

Data Analysis

This study utilized various social network analyses in UCINET 6.596, a software program designed specifically for network studies (Borgatti, Everett, & Freeman, 2002.). For each peer network of interest, the analyses included calculating the whole network density, the ego network densities, ego network homophily, and the betweenness centrality of each resident. Then, density comparisons will be run, and *t* tests were conducted to compare the degree, the ego network measures, and betweenness centrality for the residents at the start and end of the semester. Using the baseline and comparison relational data, a longitudinal analysis of ego networks was performed to pinpoint the change in the actors' networks. Finally, multiple regression quadratic assignment procedures (MR-QAPs) was conducted to find if students' attributes, particularly their program participation, could predict residents' social ties.

Network terms. The proceeding and subsequent section mention network measures of analytical importance to this study. Given that SNA is a distinct approach,

understanding the measures and characterization of network structures requires an understanding of the basic terminology of this field before the analyses are discussed in greater detail. Therefore, the relevant key terms of SNA are defined as follows.

Node. The mathematical term for the actors in a network. Depicted with a small symbol in sociograms, these usually represent individuals or organizations. For the present study, nodes represented the first-generation RLC residents (Wasserman & Faust, 1994).

Tie. Represents the relationship between actors, and is typically depicted as a line between nodes. For this study, a tie existed if the RLC resident is friends, study partners, or engaged in one of the selected supportive relationship with other resident (Scott, 2013).

Path. A sequence of adjacent nodes through which information, resources, or sentiment can be passed along through ties. The length of a path is determined by the number of connected pairs of nodes that fall along the path. The length of paths can be used determine how easily some RLC residents can access others when they need support (Borgatti et al., 2013).

Component. A set of nodes where everyone can reach every other through some path. A network can consist of multiple components, and the nodes belonging in the same component are more cohesively tied than those belonging to separate components. Thus, the number and structure of components can indicate who is in the best position to provide support throughout the network of RLC residents (Borgatti et al., 2013).

Ego network. Subsets of the whole network focused on an individual node and their most immediate ties (Scott, 2013).

Adjacency matrix. A matrix where the rows and columns are the actors in the network, and the value of the cells represents the existence of (binary) or type of (valued) tie between the dyad. For this study, the adjacency matrices used were one-mode, meaning that the actors that comprise the rows of the matrix also comprise the columns (Borgatti et al., 2013).

Network measures. Various network measures were calculated as part of the social network analysis procedures, and will be used to determine if and how the peer relationship networks in the first-generation RLC experience change. The measures of the most importance are as follows.

Degree. Degree is the number of ties of specific type a node has within the network (Wasserman & Faust, 1994). This is among the simplest measures for describing an actor's position. As degree indicates who has the most relationships, can be interpreted as a measure of popularity or influence (Borgatti, et al., 2013). Degree is a simple mathematical calculation that involves adding the values within the rows of an adjacency matrix (see Table 3.1). The equation for degree is expressed as

$$d_i = \sum_j x_{ij}$$

in which the degree of node *i* and x_{ij} is the value of the cell (i,j) in the matrix. For directed relationships, such as giving encouragement, degree is measures in terms of indegree, meaning the number of people coming to an actor for something, and outdegree, meaning the number of people that actor goes to for something. Degree, including indegree and outdegree, can be used to assess if Prime Scholars residents are forming more ties to

others by the end of the semesters, as well as indicate which residents are the most accessed friends, study partners, or providers of support.

Density. Density is one of the most commonly used measures for characterizing social networks (Borgatti et al., 2013). Density is an indicator of how closely knit the network is, and how many ties the actors share amongst themselves. The equation for density in undirected networks is

$$n(n-1)/2$$

where *n* is the number of nodes, and can be interpreted as the probability of a tie existing between a random pair of nodes. For directed networks, density is expressed as

$$\frac{\sum_{i \neq j} r_{ij}}{n(n-1)}$$

where r_{ij} is 1 if the *i* and *j* are closely tied and 0 if they are not, and *n* is the number of nodes (Borgatti et al., 2013). Both of these expressions of density will be used for this study because the friendship and study partnerships are undirected relationships, and the supportive relationships are operationalized as directed relationships. The difference between the density of the baseline networks and the comparison networks can show if the RLC residents as a whole developed more or fewer relationships with each other, and if the network changed in its level of connectedness.

Homophily. Homophily is the tendency of actors in network to have ties to those who are similar to themselves (Borgatti et al., 2013). Measuring homophily served to indicate whether the residents of the RLC have diverse peer relationships with those who are different from themselves. For this study, homophily was measured using Yule's Q,

which is a standard measure of degree to which actors' ties correspond to similarity of attributes and can be expressed as

$$Q = \frac{ad - bc}{ad + bc}$$

where *ad* is the product of the number of ties the actor has to similar people and the number of different people do not have ties to the actor, and *bc* is the product of the number of ties to similar people and the number of different people who do not have ties to the actor. The homophily of each actor was measures in the baseline networks and the comparison networks to determine if the residents of the RLC change their tendency to connect with those more like themselves.

Betweenness centrality. Centrality is a measure of a node's importance or power in the network (Borgatti et al., 2013; Wasserman & Faust, 1994). As students formed new relationships throughout the semester, it was likely that their centrality in the network structure will change. Centrality can be conceptualized mathematically in a number of ways, and *betweenness centrality* is the means that will be used to assess the residents' networks in this study. Betweenness centrality is a measure of how many alters in the network are only connected through the individual (or ego) in question (McCabe, 2016). It is calculation of how often a given node falls on the shortest path (i.e. sequence of ties among adjacent nodes through which information can be passed along) between two other nodes (Borgatti, Everett, & Johnson2013). It is often interpreted as the individual's ability to facilitate or control information flow, or excise power amongst their alters (Borgatti, Everett, & Johnson, 2013). Betweenness has been described as an appropriate measure of centrality for both directed and undirected non-valued networks, which will be investigated in this study (Freeman, 1979). Also, unlike eigenvector centrality,

betweenness centrality is a stable measure across differing network structures and when used in various analyses (Borgatti, Everett, & Johnson, 2013). This measure can be calculated as

$$b_j = \sum_{i<k} \frac{g_{ijk}}{g_{ik}}$$

where b_j is the betweenness centrality of node j, g_{ijk} in the number of paths connecting nodes i and k through j, and g_{ik} in the total number of paths connecting i and k (Borgatti et al., 2013). Measuring betweenness centrality helped to find whether residents' opportunity to influence others changed while they lived in Prime Scholars, and if the students had more limited or expansive relationships.

Addressing the Research Questions

Finding change in friendships and study partnerships. To answer the first research question, the dichotomously coded adjacency matrices representing the residents' start-of-semester and end-of-semester friendship networks were entered into UCINET. Using Net Draw, a companion software of UCINET, the sociograms of the networks at both timepoints were created, and their structures will be compared visually. The density of the baseline and the comparison network were calculated, and then a density comparisons analogous to a standard paired-samples *t* test were conducted in UCINET to find if the cohesiveness of the whole network changed. Then, each actors' degree of ties for timepoints were calculated, and the degrees were compared using a *t* test to find if there was a worthwhile difference in the number of relationships reported. Measures for ego network density were generated to find how residents' personal networks changed. These ego network measures were compared between timepoints with *t* tests to determine if

there is a significant difference in the cohesiveness of personal networks following residency in the RLC. Similarly, *t* tests of each resident's centrality measures for friendship were conducted to see if there was a notable difference in these values from the start to the end of the semester. These procedures were repeated for the study partnerships network. Conducting these analytical procedures on the friendship and study partnership networks provided evidence of whether students gained (or lost) friends and study partners during the semester, and of whether the networks as a whole became more cohesive.

To determine the changes in the network structures, longitudinal analyses of the ego networks were performed. The baseline and the comparison matrices for friendships and partnerships were input and compared in UCINET. The number of ties from both timepoints were counted to find how many friends or study partners were gained or lost by each resident during the semester. An analysis of ego networks were performed to determine if the residents were prone to homophily in their friendships and study partnerships, and preferred to be tied to those of the same scholarship status. The actor-by-attribute matrix described earlier was matched and joined with the friendship and study partnership matrices in UCINET, allowing the nodes to be identified by their scholarship status. An egonet homophily procedure was run for both timepoints to produce the Yule's Q for each resident, which is a measure of the odds that an actor will form a tie to someone of the same scholarship status. The Yule's Q yielded for both networks was compared with a *t* test to determine if students became more or less likely to form homophilous ties.

Determining the impact of participation on friendship and study partnerships. To begin addressing the second research question, each column in the previously described actor-by-attribute matrix (which included each respondent's event participation, connected course enrollment, gender, race, scholarship status, and number of non-RLC friendships and study partnerships) as converted into separate actor-by-actor matrices. The actor-by-actor adjacency matrices were then regressed as independent variables on to the friendship adjacency matrix, which is one of the dependent variables for the research question. The matrices were regressed using multiple regression quadratic assignment procedure (MR-QAP), which is a form a social network regression analysis that accounts for interdependent data and is robust enough to provide results for binary outcome data (Borgatti, Everett, & Johnson, 2013). This analysis determined if the shared event participation, shared connected course enrollment, or any of the other attributes influenced the variance in friendships with peers. The model included other node-level attributes, such as gender and major, to determine if these factors impacted the friendship network. Another MR-QAP was then conducted to determine the influence of shared program participation, shared connected course enrollment, and the other attributes on the end-of-semester study partnership network. While the outcome variables tested in these analyses are dichotomous, MR-QAP was chosen instead of logistic regression quadratic assignment procedure (LR-QAP) because the logistic regression function in UCINET was still in development at the time of this study (Borgatti, Everett, & Freeman, 2012). MR-QAP yields the same results as a LR-QAP when testing dichotomous variables, thus choosing MR-QAP and is the recommended mode of analysis (Borgatti, Everett, & Johnson, 2013). Conducting the MR-QAP procedures provided evidence of whether

program participation was predictive of students' ties within the RLC; thus, showing if the community had an impact on these relationships.

Finding change in peer support networks. To answer the third research question, adjacency matrices representing the residents' baseline and comparison support networks were loaded into UCINET. The encouragement, validation, and academic assistance matrices were transposed so that the rows will be become the columns and vice versa, which changed the direction of the relationship to make more intuitive sense for the analyses. Then, the density of the encouragement, validation, and academic assistance network will be computed for the baseline point and the comparison point. Density comparisons were conducted in UCINET to find if the cohesiveness of these networks changed. The degree of ties for each person will calculated for the all three support networks, thus providing the number of supportive relationships each student had at the start and end of the term. *T* tests were conducted to determine if there is a worthwhile difference in the number of supportive peer relationships developed while residing in the RLC. Similarly, the change in these networks were investigated with *t* tests comparing residents' betweenness centrality measures. Betweenness centrality, which is a measure of power (Borgatti, Everett, & Johnson, 2013; McCabe, 2016), was explored in this study so to examine whether students were gaining or losing the ability to influence others. This measure was intended to help the RLC identify which residents are at the core of their cohort, and had the ability to control the spread of information. Sociograms were also be created for these networks for both timepoints so that the differences can be observed visually. Conducting these analytical procedures on the peer support networks

provided evidence of whether students gain (or lose) supportive relationships during the semester, and of whether the networks as a whole became more cohesive.

To determine the changes in the network structures, longitudinal analyses of the ego networks were performed for both timepoints. The number of ties from both timepoints were counted to find how many supportive peer relationships were gained or lost by each resident during the semester. Analyses of ego networks were also performed to determine if the residents were prone to homophily of scholarship status in their supportive relationships. Egonet homophily procedures were run for both timepoints to produce the Yule's Q for each resident, which is a measure of the odds that an actor will form a tie to someone of the same scholarship status. The Yule's Q yielded for both networks were compared with *t* tests to determine if students became more or less likely to form homophilous ties. Finding if students' tendency toward homophily changed determined if students' supportive relationships became more diverse within the RLC during the course of the semester.

Determining impact of participation, friendships, and study partnerships. To begin to address the fourth research question, the end-of-semester degree of friendship ties and study partner ties for each node, which were calculated to address an earlier research question, were included as columns in the existing actor-by-attribute matrix. Then, the columns in the actor-by-attribute matrix were converted into separate actor-by-actor matrices. The actor-by-actor adjacency matrices were then regressed as independent variables on to the end-of-semester encouragement adjacency matrix, which was a dependent variable for the research question. The matrices were regressed using MR-QAP. This analysis determined if the frequency of event participation, connected course

enrollment, RLC friendship ties, RLC study partner ties, the number of non-RLC friends, and/or number of non-RLC study partners explained the variance in residents' encouragement of peers. Additional MR-QAPs were then conducted with the end-of-semester validation matrix and the end-of-semester academic assistance matrix to determine what network ties or attributes explained the variance in residents' validation and assistance of peers. Conducting these analytical procedures provided evidence of whether program participation was predictive of students' supportive relationships within the RLC; thus, showing if the community had an impact on these relationships.

Conclusion

This chapter presented an overview of the methods that were implemented in this study. The site and sample were introduced to provide context for the study, and the survey and data collection process were described. This chapter also described the how program participation was operationalized, as well as the social network measures that were calculated to assess the RLC residents' peer networks. Finally, this chapter detailed how each research question was answered using a variety of social network analyses, including paired density comparison, *t* tests, and MR-QAP. This next chapter will describe the implementation of the study methodology and the results of the analyses.

CHAPTER IV:

Analysis and Results

This chapter discusses the results of using social network analysis procedures to explore the peer involvement and supportive relationships of the residents of a first-generation residential learning community, the Prime Scholars*. The analytical procedures were performed using data from two network surveys conducted during the RLC residents' first semester in college, as well as data procured from the RLC's administrative records from that semester. The results include sociograms, comparisons of various networks measures, and the findings of a series of MR-QAPs. These results are detailed following a discussion describing the distribution of the survey to the RLC population.

Prime Scholars

In during the spring of 2016, the director of the Prime Scholars RLC consented to allow the incoming residents to participate in this study during the subsequent Fall 2016 semester. The Institutional Review Board (IRB) granted their approval of the project that same spring. While the study was being prepared, the Prime Scholars administrators accepted their incoming freshman for the fall; however, the exact size of the incoming resident population was not known until August. The new freshman population of the Prime Scholars community was finalized at 61 students. As approved by IRB, the director provided the names of the incoming students so that they may be included in the network surveys, as described in Chapter III.

The network surveys were created and approved by the director of the RLC before being uploaded into the Qualtrics online survey system. The final start-of-semester

survey and the final end-of-semester survey can be found in Appendix B. The start-of-semester survey was distributed to students during orientation week, following the move-in activities, via an emailed link to all incoming students. After one week, the students were sent another email with a reminder and a link to the survey. Another reminder email for sent to students after the second week of distribution, and the director reported that the survey was promoted throughout the community's programs. When the survey was closed at the end of students' third week on campus, responses were collected from 37 residents. Two of the students anticipated to move in during this time (and thus, were included in the text of the survey) never matriculated into the program, leaving the population to number 59 residents. Thus, the response rate for the baseline survey was 62.7%.

After the baseline survey closed, the students continued their first semester in the RLC. The second network survey, which was edited to remove students that left the program, was distributed to students three weeks from the end of the semester. Many of the students completed the survey at the request of the director at a dinner event sponsored by the RLC. Following this, a link to the survey was emailed to the students, and a reminder email was sent a week later. The second survey collected 29 responses, 25 from those who responded to the previous survey, and thus had a 49.2% response rate.

The residents of the community collected a component of the secondary data used for this study, their event participation. Unlike in previous years, the RLC administration did not track students' event participation in program events during the Fall 2016. The RLC utilized a new online organization networking system, and students were asked to track their participation in program events themselves. However, most students did not

take advantage of the new tracking system, and did not record the events they attended during the semester. For most residents, no data was available for their event participation. The other component of secondary data used for these analyses included the RLC administration's record of connected course enrollment. The connected courses are courses that are meant specifically for the RLC residents to take together as a shared experience. These courses are also meant to reinforce the RLC's theme: first-generation college student learning and retention. The RLC sponsored two sections of the connected course during Fall 2016, and encouraged its residents enroll. Enrollment was not mandatory due to differences in majors of study, so less than half of the first-year residents enrolled in the course. As 46 of the 59 Prime Scholars residents completed at least one of the network surveys, 78.0% of the population consented to have their event participation and connected course enrollment records used for the study.

Answering the Research Questions

The results described in this chapter were derived from network measures estimated from the network survey data, the sociograms of the networks, and hypothesis testing of the residents' characteristics and the social ties described in the surveys. The following research questions guided the analyses of these networks and the secondary data:

1) How do first-generation RLC students' friendships and study partnerships change during the first semester of enrollment?
2) How is participation in RLC programming associated with the end-of-semester friendships and study partnerships of first-generation students?
3) How does the structure of supportive peer networks change during the first semester of enrollment?

4) How is participation in RLC programming and involvement in friendships and study partnerships associated with residents' supportive peer relationships at the end of the semester?

The first research question is answered by comparing the network measures for the friendship and study partnership networks reported at the start and at the end of the first semester. A comparison of the start-of-semester and end-of-semester density, homophily, betweenness centrality, and degree measures are presented in this chapter. The network maps of the friendship and study partnership networks are also presented. A multiple regression QAP (MR-QAP) addressed the second and the fourth research question, and the results of these MR-QAPs detail the impact of program participation on students' supportive relationships at the end of the semester. The third research question was also answered by comparing the start-of-semester and end-of-semester network measures for the supportive relationships, and the network maps of these relationships are also displayed in this chapter.

Descriptive Statistics

The network surveys used for this project prompted respondents to describe their college major, scholarship status, sex, and race. Of the 59 students that composed the community, 46 of the RLC residents participated in either the baseline survey, the comparison survey, or both; thus, responses to the demographic portion of these surveys were collected for 46 individuals. Some students responded to the network portions of the survey, but opted not the respond to the demographic items. It was the opinion of the RLC director that respondents skipped these items due to inexperience with completing surveys. Following the collection of the baseline and comparison network surveys,

descriptive statistics were generated from these responses so to help RLC administrators, as well as higher education researchers, visualize the RLC population and the diversity of the students involved in the program. In the Prime Scholars community, most residents reported that they were female (47.5%), White (47.5%), and belonged to the Jacobsen Students scholarship program (40.7%). Numerous majors of study were represented in the Prime Scholars community. Most of the RLC residents reported majors related to science (i.e. biology, chemistry, pre-med). The frequencies for the students' demographic data are displayed in the tables below.

Table 4.1

Frequencies of Sexes within Prime Scholars RLC

	Frequency	Percent (%)
Male	18	30.5
Female	28	47.5
Unknown	13	22.0

Table 4.2

Frequencies of Jacobsen Students amongst Prime Scholars RLC

Scholarship Status	Frequency	Percent (%)
Jacobsen Student	24	40.7

Table continues

Table 4.2 continued

Scholarship Status	Frequency	Percent (%)
Non-Jacobsen Student	22	37.3
Unknown	13	22.0

Table 4.3

Frequencies of Race within Prime Scholars RLC

	Frequency	Percent (%)
White	28	47.5
Black/African American	10	16.9
Hispanic/Latino(a)	4	6.8
Asian/ Asian American	0	0
Other	0	0
Two or more races	2	3.2
Unknown	13	22.0

Table 4.4

Frequencies of Majors of Study within Prime Scholars RLC

Category of major	Frequency	Percent (%)
Sciences (Biology, Chemistry, etc.)	17	28.8
Humanities (Art, History, etc.)	6	10.2

Table continues

Table 4.4 continued

Category of major	Frequency	Percent (%)
Education	4	6.8
Public Health	5	8.5
Business (Accounting, Management, etc.)	3	5.1
Engineering (Computer Engineering, Chemical Engineering, etc.)	4	6.8
Undecided	5	8.5
Unknown	15	25.4

Change in Friendships and Study Partnerships

The first research objective of this study necessitated that the friendship and study partnership networks reported by residents at the start of the semester be compared to those reported at the end of the semester. To accomplish this comparison and determine if any change occurred, the responses to the network surveys were dichotomously coded into adjacency matrices for each relationship at each timepoint. Each vector in an adjacency matrix indicated the alters with whom an actor reported a relationship. As friendship and study partnerships were conceptualized for this project as being inherently reciprocal relationships, the row and columns of the matrices were symmetrized in UCINET, as described in Chapter III. Similarly, the relationships indicated by those who completed the network surveys were used to fill in the empty vectors for those residents who did not complete the survey. Chapter III contains more information regarding the

coding process for these matrices. To answer the first research question, this data was analyzed by generating sociograms, conducting *t* tests of densities, degrees, and egonet measures, and comparing the betweenness centrality of both timepoints. The results of these analytical procedures are described further in this section.

Sociograms. The symmetrized datasets were imported into UCINET so that physical representations of these network could be mapped as sociograms. These sociograms visually depicted all the actors reported as part of the network and the ties existing between them. Such maps are important to visualizing key aspects of social networks, as well as identifying changes in networks over time. Presented in this section are the sociograms of the RLC's start-of-semester friendships, end-of-semester friendships, start-of-semester study partnerships, and end-of-semester partnerships. Each of these maps incorporates the demographic information reported by the residents.

Maps of Prime Scholars friendships. The sociograms generated to represent the start-of-semester and end-of-semester friendships include all the residents who completed the network surveys or were identified as being friends with someone who completed the surveys. These maps were created in Net Draw, a companion software of UCINET. Figure 4.1 shows the whole network map of the friendship ties that students reported during the orientation period of the semester. This baseline network shows a thick tangle of friendship ties toward the center, but numerous nodes on the outer edges that only have one or two friendship ties. Three students are represented as isolate nodes, which indicates that they had no friendships to report. Although the residents have just moved into the RLC at this point in the semester, many participants reported several existing friendships within the community. The map also shows that the students toward the

center of the map, who have the most friendship ties within the network, are mostly female (represents as circle-shaped nodes).

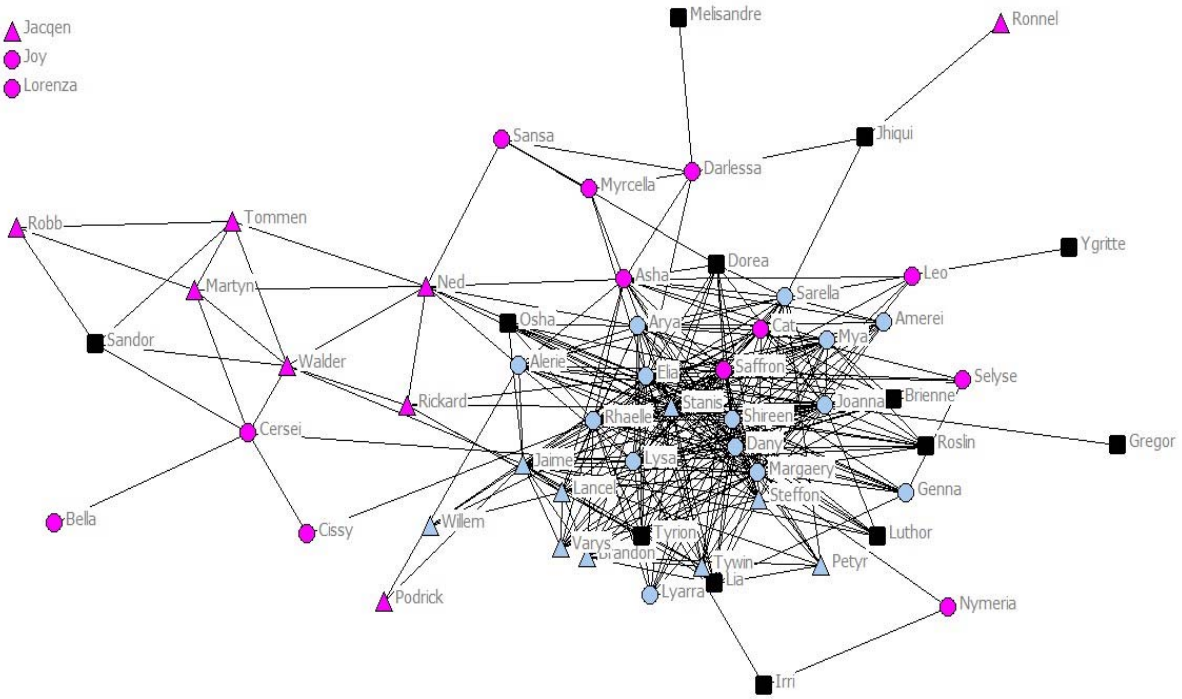

Figure 4.1. Start of Semester Friendship Ties within RLC
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Figure 4.2 shows the whole network map of the friendship ties that students reported during the last weeks of the semester. This second network is visibly much more crowded than the network from the start of the semester. Fewer nodes have only one or two ties to alters. Now, most of the nodes have at least four friendship ties. The nodes that were clustered tightly in the center of the first map have now dispersed somewhat as other individuals reported more friendships, and their nodes moved closer to the center of the map. Although this sociogram shows that more friendship ties were formed, this second network has one more isolate than the first, and only one of these isolated nodes appeared

in the initial network. Thus, three individuals lost all their friendship ties by the end of the semester, and one individual had no reported friendships at the start or end of the semester.

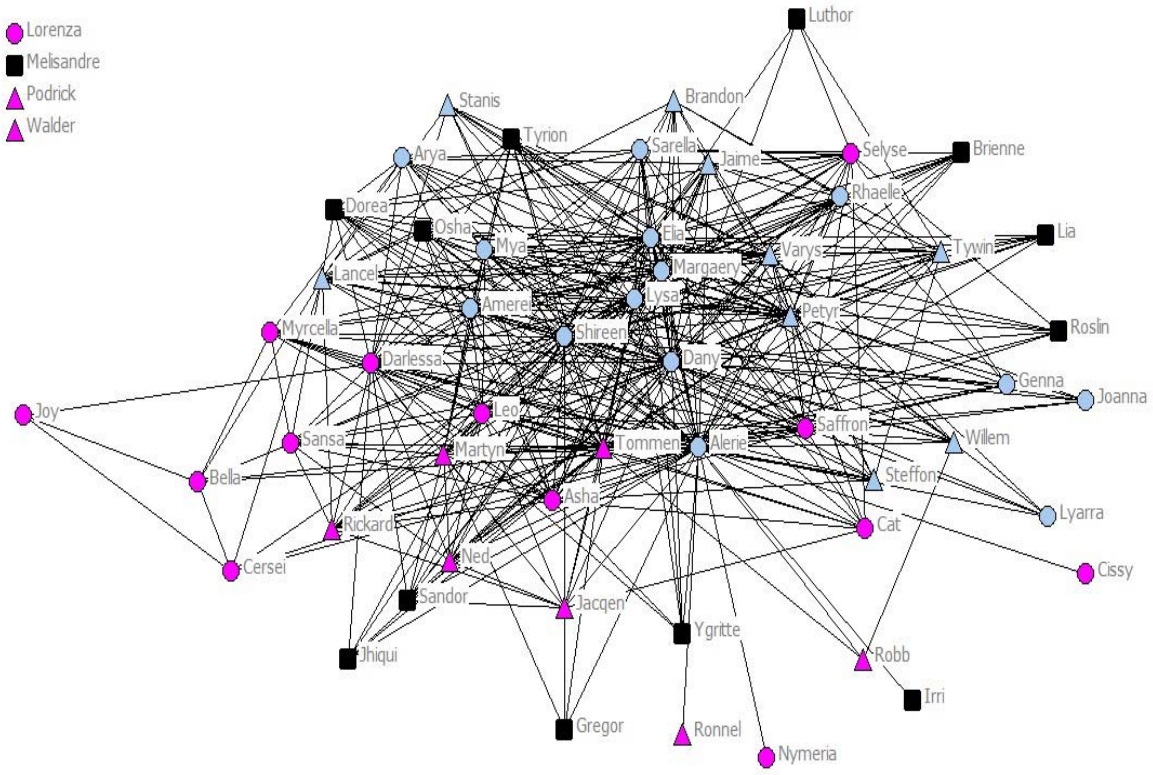

Figure 4.2. End of Semester Friendship Ties within RLC
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Maps of study partnerships. Figure 4.3 shows the whole network map of the study partnerships that students reported during the orientation period of the semester. This baseline network depicts a noticeable sunburst pattern, meaning that at the start of the semester, study partnerships were centralized around a single node. The majority of

nodes represented within the study partnerships network only have a one tie to an alter. Numerous nodes have no study partnership ties represented, and are shown as isolates on the side of the sociogram.

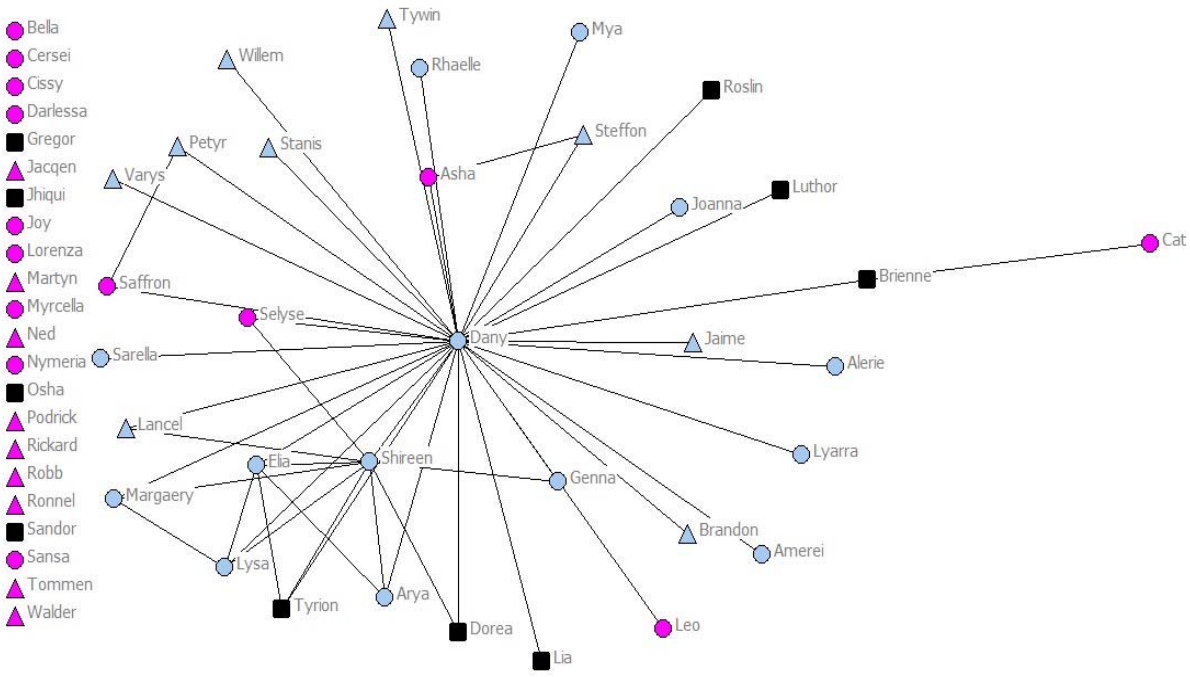

Figure 4.3 Study partnerships at the start of the semester
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Figure 4.4 shows the whole network map of the study partnerships that students reported during the last weeks of the semester. The study partnership ties have shifted around greatly, and the structure of the map is very different from the baseline. This second network noticeably less centralized around a single node. Instead of radiating out from the actor "Dany", the study partnership ties form two distinct groups that are bridged by the actor "Lysa". The structure also has distinct paths along which information could travel through ties from "Genna" to "Willem", though they are on opposite sides of the

network. More nodes have two or three ties to others, rather than just one. Although there are fewer isolates in this network, the end-of-semester study partnership network is not crowded or dense. Many nodes still are not represented as having any study partnerships.

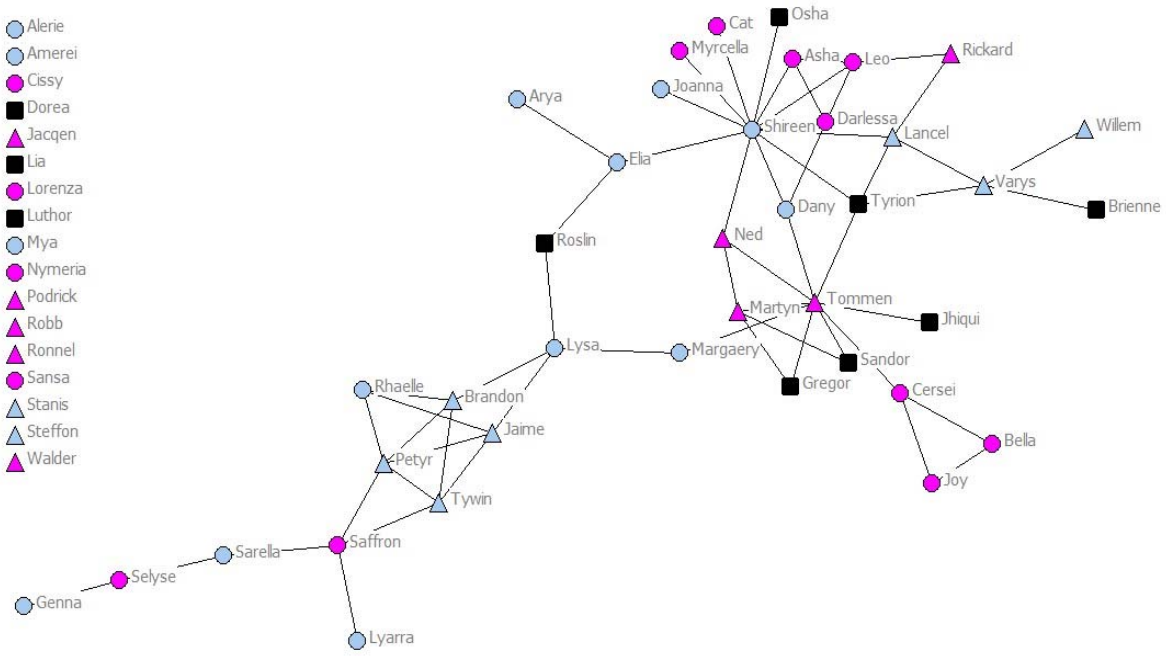

Figure 4.4 Study partnerships at the end of the semester
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Possibility of commission error. The aforementioned maps show that the initial study partnership network was centralized around "Dany", who reported 32 ties at the start of the semester. This was far more than the number of relationships reported by any other student during this timepoint. However, "Dany" has three study partnerships during at end of the semester, which was a notable and unusual reduction. There are several possibilities for this sharp change. First, "Dany" may have had 32 study partners before entering college, and then narrowed her group down to three during first semester. Second, "Dany" may have had a more lenient definition of study partnership than her

peers at the start of the term, and this definition became stricter over time. Third, “Dany” may have experienced response fatigue, or was disinterested in this survey question. Finally, “Dany” may have misunderstood this question on the baseline survey. These last two possibilities could have led to commission error, which is when ties are erroneously included because a respondent endorsed falsely more relationships (Borgatti, Everett, & Johnson, 2013). Therefore, “Dany’s” atypical position in the baseline network may be accurate to her experience, but also may be the result of error that skewed the results. To illustrate how the map of the network is vulnerable to commission error, sociograms of the study partnership networks with “Dany” excluded are displayed in Figures 4.5 and 4.6.

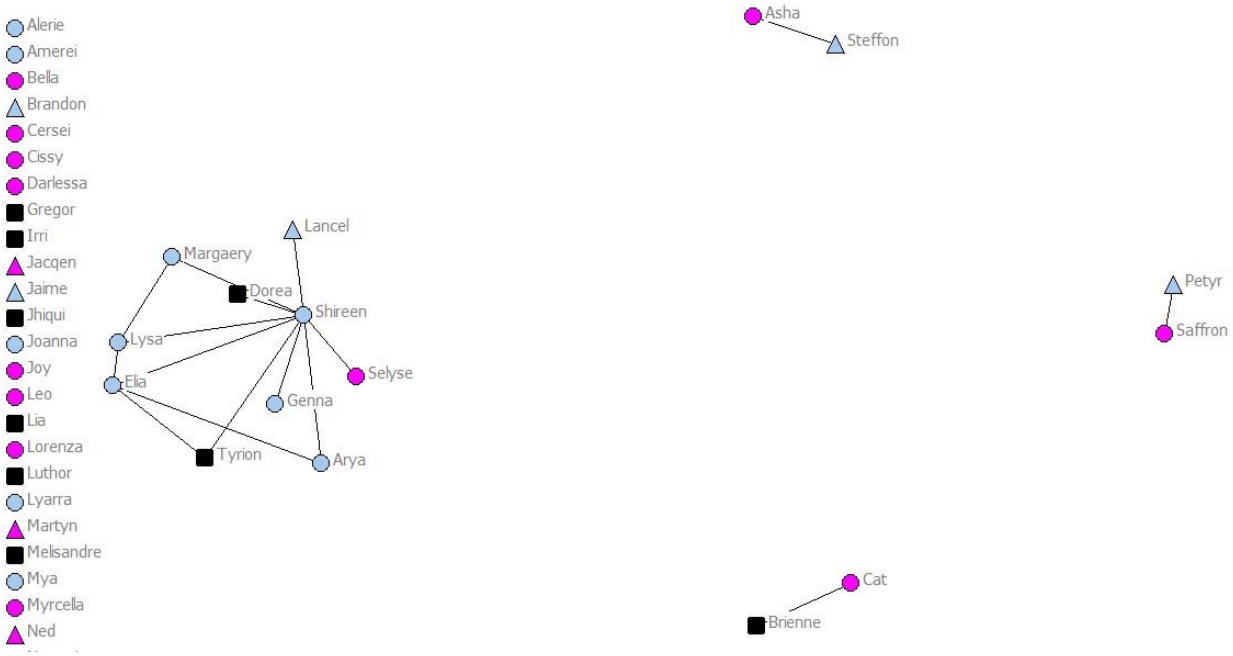

Figure 4.5 Study Partnerships Excluding “Dany” at the Start of the Semester
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Figure 4.5 shows that without the respondent "Dany", the network is much sparser and disconnected. Very few residents are involved with this network. Most residents did not report studying with any peer at the start of the semester. Therefore, if "Dany's" response is an example of commission error, then it inaccurately depicted the initial study partnerships as more cohesive.

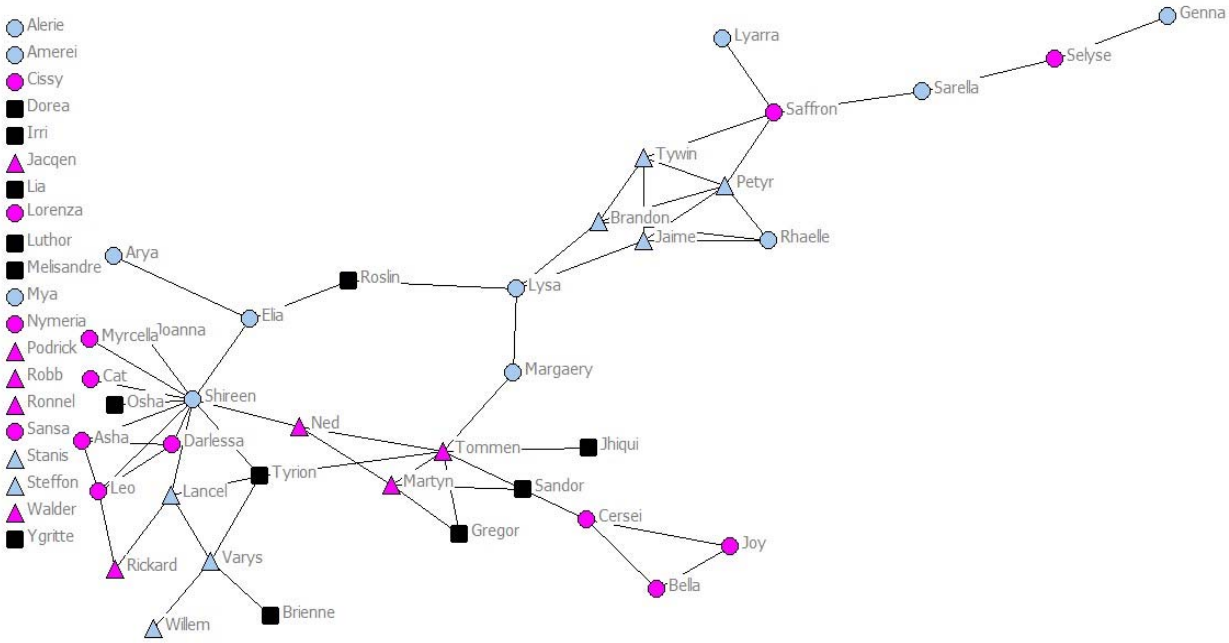

Figure 4.6 Study Partnerships Excluding "Dany" at the End of the Semester
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Figure 4.6 shows that when "Dany" is excluded, the end-of-semester study partnership have almost the same structure as when this respondent was included. This network map is much more interconnected than the baseline, as the study partnership have linked together into one component. The limited divergence displayed in this sociogram shows that the possibility of commission error associated with "Dany" mainly affects the map of, and likely the measures of, the baseline network.

Change in network density and degree. Change in the friendships and study partnerships was further investigated by comparing the network measures of start-of-semester and end-of-semester networks. Using UCINET, multiple measures were calculated to find the overall density of these networks, which is a measure of the cohesiveness of the residents' ties, the number of ties within the networks, and the average degree of ties for the actors. The baseline and comparison friendship network measures are detailed in Table 4.5. To find if the difference in density was significant, the whole network densities from both timepoints were then compared in UCINET using the compare densities function bootstrapped to 10,000 samples (Network> Compare densities> Paired [same nodes]). The density of the end-of-semester network was found to be significantly greater, $t(-2.61)$, $p= 0.01$.

Degree was then calculated for each actor in the network to provide a measure for how many alters the actor is tied to in the network. After the degree for each actor was calculated for both timepoints in UCINET (Network> Centrality and Power> Degree), the average degree measures were compared using a paired-sampled *t* test in SPSS 24 [1]. The results found showed that there was a statistically significant increase in the mean degree at the end of the semester, $t(58)=-2.513$, $p= .015$. Therefore, on average, residents had more friendships at the end of the semester.

[1] The *t* tests used in this study were originally going to be performed in UCINET using the Hypothesis Testing function. However, technical limitations prevented these analyses from running. The paired-samples *t* tests were performed in SPSS 24 instead. This was viewed as an appropriate alternative because this process compared the means of previously calculated individual measures, and did not involve dyadic data which cannot be assumed independent (Borgatti, Everett, & Johnson, 2013).

Table 4.5

Overall Network Density Measures for Friendship Networks

	Start-of-semester	End-of-semester
Density	0.19	0.28
Number of ties	632	828
Average degree	10.90	15.06

For the start-of semester and end-of-semester study partnerships, the whole network measures are detailed in Table 4.6. These differences in densities were also compared in UCINET with the compare densities function bootstrapped to 10,000 samples. However, the change was not found to be statistically significant.

Degree was then calculated for each actor in the study partnership network to provide a measure for how many alters the actor is tied to in the network. After the degree for each actor was calculated for both timepoints in UCINET, the average degree measures were compared using a paired-samples *t* test. The results found that there was not a statistically significant increase in the mean degree at the end of the semester. Therefore, it could not be proven that residents on average had more study partners at the end of the semester.

These calculations were also performed for the study partnership networks with "Dany" excluded. Without "Dany", the density comparison found that the end-of-semester network was significantly denser than the start-of-semester, $t(55)= -3.88$, $p= 0.05$. The paired-samples *t* test of the residents' degrees found a statistically significant increase in the mean degree at the end of the semester, $t(54)= -5.81$, $p\leq 0.001$. Thus, if

"Dany's" responses are an example of commission error, then this error did effect whether change was observed.

Table 4.6

Overall Network Density Measures for Study Partnership Networks

	Start-of-semester	End-of-semester	Start-of-semester without "Dany"	End-of-semester without "Dany"
Density	0.04	0.06	0.01	0.03
Number of ties	96	116	32	110
Average degree	1.88	2.64	0.55	1.90

Change in ego networks for friendship and study partnership networks. In addition to calculating the whole network density for both the friendships and the study partnerships, the ego network density was also calculated for each of the actors in these networks. Ego network density is a measure of the proportion of the actor's (or ego's) alters who are connected to one another, and indicates how limited the actor is when looking to gain or impart information to someone (Borgatti, Everett, & Johnson, 2013). The densities of the ego networks were then compared with a paired-samples *t* test to find if there was any discernable change between the start and the end of the semester. For the friendship networks, there was no significant difference between the ego network density for the start of the semester and the end of the semester. For the study partnership networks, there was also not a statistically significant difference in the ego network densities of the two timepoints.

To acquire further details about how the friendship and study partnership networks changed over the course of the semester, the longitudinal change in the ego networks compared in UCINET to determine manner of which actors lost or gained ties during the semester (Network> Ego networks> Longitudinal> Egonet change). The results of the longitudinal egonet analysis for the friendship networks are displayed in Table 4.7. On average, residents gained 7.83 new friendships, lost 4.51 friendships, and never befriends 39.46 of their peers. The results for the study partnerships are displayed in Table 4.8. On average, residents studied with 1.69 additional peers, lost 0.34 study partners, and never studied with 51.46 peers. With "Dany" excluded, residents studied with 1.82 additional peers, lost 1.46 study partners, and never studied with 54.76 peers.

Table 4.7

Longitudinal Egonet Analysis Results for RLC Friendships

Resident[2]	Start of Semester	End of Semester	New Ties	Lost Ties	Kept Ties	Never Ties
Alerie	14	51	39	2	12	5
Amerei	10	25	16	1	9	32
Arya	20	14	4	10	10	34
Asha	17	20	9	6	11	32
Bella	1	7	6	0	1	51
Brandon	12	11	4	5	7	42
Brienne	11	9	4	6	5	43
Cat	16	11	7	12	4	35
Cersei	6	6	5	5	1	47
Cissy	2	1	1	2	0	55
Dany	32	45	13	0	32	13
Darlessa	6	29	24	1	5	28
Dorea	11	14	7	4	7	40

Table continues

[2] All names of residents are pseudonyms

Table 4.7 continued

Resident	Start of Semester	End of Semester	New Ties	Lost Ties	Kept Ties	Never Ties
Elia	33	35	4	2	31	21
Genna	9	8	2	3	6	47
Gregor	1	4	4	1	0	53
Irri	2	1	1	2	0	55
Jacqen	0	13	13	0	0	45
Jaime	22	16	6	12	10	30
Jhiqui	3	6	5	2	1	50
Joanna	21	6	2	17	4	35
Joy	0	3	3	0	0	55
Lancel	15	18	8	5	10	35
Leo	4	24	21	1	3	33
Lia	10	7	2	5	5	46
Lorenza	0	0	0	0	0	58
Luthor	7	4	2	5	2	49
Lyarra	8	5	2	5	3	48
Lysa	21	27	12	6	15	25
Margaery	32	29	6	9	23	20
Martyn	5	24	22	3	2	31
Melisandre	1	0	0	1	0	57
Mya	15	16	9	8	7	34
Myrcella	4	13	9	0	4	45
Ned	10	12	7	5	5	41
Nymeria	2	1	1	2	0	55
Osha	8	12	10	6	2	40
Petyr	8	30	22	0	8	28
Podrick	2	0	0	2	0	56
Rhaelle	24	15	5	14	10	29
Rickard	6	13	11	4	2	41
Robb	3	3	2	2	1	53
Ronnel	1	1	1	1	0	56
Roslin	9	7	3	5	4	46
Saffron	26	20	6	12	14	26
Sandor	4	10	9	3	1	45
Sansa	4	14	10	0	4	44
Sarella	17	15	4	6	11	37
Selyse	7	16	10	1	6	41
Shireen	32	38	12	6	26	14
Stanis	34	9	2	27	7	22

Table continues

Table 4.7 continued

Resident	Start of Semester	End of Semester	New Ties	Lost Ties	Kept Ties	Never Ties
Steffon	16	10	4	10	6	38
Tommen	5	35	31	1	4	22
Tyrion	11	13	8	6	5	39
Tywin	10	12	5	3	7	43
Varys	10	25	15	0	10	33
Walder	7	0	0	7	0	51
Willem	4	9	7	2	2	47
Ygritte	1	6	5	0	1	52

Table 4.8

Longitudinal Egonet Analysis Results for RLC Study Partnerships

Resident	Start of Semester Ties	End of Semester Ties	New Ties	Lost Ties	Kept Ties	Never Ties
Alerie	1	0	0	1	0	54
Amerei	1	0	0	1	0	54
Arya	3	1	0	2	1	52
Asha	2	3	3	2	0	50
Bella	0	2	2	0	0	53
Brandon	1	4	4	1	0	50
Brienne	2	1	1	2	0	52
Cat	1	1	1	1	0	53
Cersei	0	3	3	0	0	52
Cissy	0	0	0	0	0	55
Dany	32	3	2	31	1	21
Darlessa	0	4	4	0	0	51
Dorea	2	0	0	2	0	53
Elia	5	3	1	3	2	49
Genna	2	1	1	2	0	52
Gregor	0	2	2	0	0	53
Jacqen	0	0	0	0	0	55
Jaime	1	4	4	1	0	50
Jhiqui	0	1	1	0	0	54
Joanna	1	1	1	1	0	53

Table continues

Table 4.8 continued

Resident	Start of Semester Ties	End of Semester Ties	New Ties	Lost Ties	Kept Ties	Never Ties
Joy	0	2	2	0	0	53
Lancel	2	4	3	1	1	50
Leo	1	4	4	1	0	50
Lia	1	0	0	1	0	54
Lorenza	0	0	0	0	0	55
Luthor	1	0	0	1	0	54
Lyarra	1	1	1	1	0	53
Lysa	4	4	3	3	1	48
Margaery	3	2	1	2	1	51
Martyn	0	4	4	0	0	51
Mya	1	0	0	1	0	54
Myrcella	0	1	1	0	0	54
Ned	0	3	3	0	0	52
Nymeria	0	0	0	0	0	55
Osha	0	1	1	0	0	54
Petyr	2	5	4	1	1	49
Podrick	0	0	0	0	0	55
Rhaelle	1	3	3	1	0	51
Rickard	0	2	2	0	0	53
Robb	0	0	0	0	0	55
Ronnel	0	0	0	0	0	55
Roslin	1	2	2	1	0	52
Saffron	2	4	3	1	1	50
Sandor	0	2	2	0	0	53
Sansa	0	0	0	0	0	55
Sarella	1	2	2	1	0	52
Selyse	2	2	2	2	0	51
Shireen	10	12	8	6	4	37
Stanis	1	0	0	1	0	54
Steffon	2	0	0	2	0	53
Tommen	0	9	9	0	0	46
Tyrion	3	4	3	2	1	49
Tywin	1	4	4	1	0	50
Varys	1	4	4	1	0	50
Walder	0	0	0	0	0	55
Willem	1	1	1	1	0	53

Change in egonet homophily for friendships and study partnerships. For both the friendship networks and the study partnership networks, an egonet homophily procedure was conducted to measure the residents' tendency to form ties with those of the same scholarship status (Jacobsen Student or non-Jacobsen Student). A homophily measure, Yule's Q, was produced for each actor for both timepoints, and the start-of-semester and the end-of-semester measures were compared with a paired-samples *t* test. For the friendship networks, the mean Yule's Q at the start of the semester was 0.14 (SD=0.81). The mean Yule's Q at the end of the semester was 0.08(SD=0.76). This shows that residents were slightly homophilous at the start and end of the semester, and preferred to befriend those of the same scholarship status. These are slight tendencies because perfect homophily reaches a Yule's Q of 1. No significant difference was found between the mean Yule's Q measures for the start and end of the semester. For the study partnership networks, the mean Yule's Q at the start of the semester was 0.09 (SD=0.74). The mean Yule's Q at the end of the semester was -0.17 (SD=0.70). This indicates that residents were slightly homophilous at the start of the term, but slightly tended to study with those of the opposite scholarship status by the end of the term. There was a significant difference in the mean Yule's Q, $t(51)= 2.49$ p=.016. However, when "Dany" is excluded from the study partnership network, no significant difference is found in the mean Yule's Q between the two timepoints.

Change in betweenness centrality of the friendship and study partnership networks. For each of the actors in the friendship networks and the study partnership networks, betweenness centrality was calculated in UCINET to provide an indicator of the actor's importance at the start and the end of the semester. The betweenness centrality measures

for each of the residents for both timepoints for both relationships are displayed for comparison in Appendix B. The most central resident in the start-of-semester friendship network "Elia", but at the end of the semester, "Alerie" is the most central resident. For the study partnership networks, "Dany" is the most central resident, while "Tommen" is the most central at the end of the semester. Betweenness measures for the two friendship networks were compared with a node level *t* test. No statistically significant difference was found between the mean betweenness centrality measures at the start of the semester and the end of the semester. The same procedure was performed to compare the centrality measures of the study partnership networks. For this relationship, there was statistically significant difference in the resident's mean centrality measures from the start of the semester (M= 9.71, SD= 66.24) and the end of the semester (M=42.5, SD= 76.6), $t(55)= -2.424$, p= .019. On average, the residents became more central in the study partnership network. This pattern held even when "Dany" was excluded, as the *t* test still found a statistically significant increase in the mean centrality between the start (M=0.55, SD= 3.94) and end of the semester (M=39.68, SD= 73.48), $t(54)= -4.152$, $p \leq 0.001$.

Impact of program participation on friendship and study partnerships

The second research question of this study aimed to find if the activities of the RLC impacted the residents' involvement in friendships and study partnerships at the end of the semester. To investigate how much of the variance in the friendship and study partnership ties were predicted by residents' event participation and connected course enrollment, as well as other attributes such as sex and scholarship status, two MR-QAPs were performed to regress these variables onto the end-of-semester friendship network and the end-of-semester study partnership network. As described in Chapter III, MR-

QAP was chosen for this analysis because it is most appropriate for network data, and the dependent variables set by the research question are dyadic, not independent observations (Borgatti, Johnson, & Everett, 2013).

The independent variables for the MR-QAPs consisted of the residents' attribute data: sex, race, scholarship status, major, number of friends outside of the RLC, and number of study partners outside of the RLC. The number of outside friends and study partners were included to find if differing degrees of non-RLC peer involvement influenced the variance in RLC ties. The participation data, connected course enrollment and event attendance, were also included in the model. As MR-QAP is an analysis of dyadic data, each of these node-level attributes were converted in UCINET to create dyadic actor-by-actor matrices (Data> Attribute to matrix). In these matrices, each entry expressed the attribute relationally. For example, the sex attribute file was converted into a 'same sex as' matrix, in which a value of 1 in in cell *i*, *j* meant that actor *i* and actor *j* were of the same sex. 'Same as' matrices were also created for the other categorical variables of race, major, and scholarship status. The secondary data for connected course enrollment was also converted into a 'same as' matrix, where a value of 1 in in cell *i*, *j* meant that actor *i* and actor *j* either in the connected course together, or both not enrolled in the course.

Similar to the categorical demographic variables, data for the number of outside friends and number of outside study partners were collected on the end-of-semester network survey. The students provided this information by responding to open response items. However, as these items were open response, many residents did not provide valid responses. Therefore, this data point was missing for several participants. These variables

also differed from the demographic variables because they were continuous. Instead of being converted into 'same as' actor-by-actor matrices, both of these attributes were converted into 'absolute difference' actor-by-actor matrices, in which the value of cell *i*, *j* expressed the absolute difference in the number of non-RLC friends (or study partners) reported by actor *i* and actor *j*.

The event participation attribute variable also presented a challenge because many residents did not record their event attendance, and thus, event participation records were missing for most residents. For the ten residents that did record their attendance, a categorical variable was created, with the value representing which of the 14 events the resident recorded participation. This attribute was then converted into a 'same' actor-by-actor matrix, in which the value of cell *i*, *j* expressed if actor *i* and actor *j* attended an event together.

MR-QAP results for friendship. The MR-QAP for friendship was run with 10,000 permutations in UCINET (Tools> Testing hypotheses> Dyadic(QAP)> MR-QAP Linear Regression> Double Dekker the Semi-Partialling MR-QAP). The end-of-semester friendship network was set as the dependent variable for the model, and the independent variables included the following: 'same sex as' matrix, 'same race as' matrix, 'same scholarship status as' matrix, 'same major as' matrix, 'same connected course enrollment as' matrix, 'absolute difference in non-RLC friends' matrix, 'absolute difference in non-RLC study partners' matrix, 'same event participation' matrix, the end-of-semester study partnership network, and the start-of-semester friendship matrix. The start-of-semester friendship matrix was included to control for the influence of residents' preexisting friendships. The results of the regression are summarized in Table 4.9

Table 4.9

Friendship MR-QAP Results

Variable	Friendship Model	SE
Same Sex As	0.046*	0.026
Same Race As	0.026	0.042
Same Scholarship Status As	0.045	0.028
Same Major As	-0.052	0.043
Same Connected Course Enrollment As	0.045	0.038
Absolute Difference in Non-RLC Friendships	0.003	0.003
Absolute Difference in Non-RLC Study Partnership	-0.001	0.017
Same Event Participation As	-0.059	0.062
Study Partnerships at End of Semester	0.559***	0.066
Friendships at Start of Semester	0.330***	0.052
R-squared	0.228***	

*p< 0.05, **p<0.01, ***p<0.001

The model had a significant *R*-squared of 0.228, meaning that the model explained about 22.8% of the variance amongst the end-of-semester friendship dyads. The coefficients for ‘same race as’, ‘same major as’, ‘same scholarship status’, ‘same connected course enrollment as’, and ‘same event participation as’ were not significant, indicating that being the same race, major, or scholarship status did not have a significant effect on the number of friendships one would expect to see in any batch of 1000 dyads. Nor did having shared connected courses or attending the same events. The variable for ‘absolute difference in non-RLC friendships’ and ‘absolute difference in non-RLC study partnerships’ also were not significant. Thus, the absolute difference in the number of outside friends and study partners did not have a significant impact on the number of RLC friendships that one would observe in a batch of 1000 dyads. The ‘same sex as variable did have a significant coefficient of 0.046; therefore, being of the same

scholarship status means that the dependent variable will be 0.046 units higher on average than when the actors are not of the same scholarship status. Or to state alternatively, one would see 46 additional cases of friendships in a batch of 1000 dyads when *i* and *j* are friends. The end-of-semester study partnership network had a statistically significant coefficient of 0.559. This result means that when *i* and *j* study together at the end of the term, one would observe about 559 more instances of friendships in any batch of 1000 dyads. The control variable of start-of-semester friendships was also statistically significant with a coefficient of 0.330. Thus, one would expect to see an additional about 330 instances of friendships in a batch of 1000 dyads when *i* and *j* were friends at the start of the term.

MR-QAP results for study partnerships. The MR-QAP for end-of-semester study partnerships was run with 10,000 permutations in UCINET. This network was set as the dependent variable for the model. The independent variables were the same as those for the friendship model, expect the end-of-semester friendship network was included as a variable, and the start-of-semester study partnership network was used as a control. The results of the regression are summarized in Table 4.10

Table 4.10

Study Partnerships MR-QAP Results

Variable	Study Partnerships Model	SE
Same Sex As	0.015	0.010
Same Race As	-0.018	0.012
Same Scholarship Status As	0.003	0.011
Same Major As	0.023*	0.013
Same Connected Course Enrollment As	0.008	0.010

Table continues

Table 4.10 continued

Variable	Study Partnerships Model	SE
Absolute Difference in Non-RLC Friendships	0.000	0.001
Absolute Difference in Non-RLC Study Partnership	0.002	0.004
Same Event Participation As	0.016	0.013
Friendships at End of Semester	0.125***	0.014
Study Partnership at Start of Semester	0.022	0.032
R-squared	0.104***	

*p< 0.05, **p<0.01, ***p<0.001

The model had a significant *R*-squared of 0.104, meaning that the model explained about 10.4% of the variance amongst the end-of-semester friendship dyads. The coefficients for 'same sex as', 'same race as', 'same scholarship status as', 'same connected course enrollment as', and 'same event participation' were not significant. The variable for 'absolute difference in non-RLC friendships' and 'absolute difference in non-RLC study partnerships' also were not significant. The 'same major as' variable did have a significant coefficient of 0.023. One would see about 23 additional cases of study partnerships in a batch of 1000 dyads when *i* and *j* study together. The end-of-semester friendship network had a statistically significant coefficient of 0.125. This result means that when *i* and *j* are friends at the end of the term, one would expect to see about 125 more instances of study partnership in any batch of 1000 dyads. The control variable of start-of-semester study partnerships was not statistically significant. Thus, one would not expect to see an additional instances of study partnerships in a batch of 1000 dyads when *i* and *j* studied together at the start of the term. This procedure as not repeated for the network excluding "Dany" because it is not certain that commission error occurred.

Change in Peer Support Networks

The third research objective of this project required that the peer support networks described by residents at the start of the semester be compared to those described at the end of the semester. These peer support networks encompassed relationships based in encouragement, validation, and academic assistance. To compare these networks and determine if any change occurred, the responses to the network surveys were coded into adjacency matrices for each relationship at each timepoint, similar to the coding for the friendship and the study partnership networks. However, unlike the friendship and study partnership networks, the peer support relationships were not conceptualized as inherently reciprocal relationships. Thus, the networks were directed, and the row and columns of the matrices were not symmetrized. Again, the relationships indicated by those who completed the network surveys were used to fill in the empty vectors of those residents who did not complete the survey. This data was then analyzed by generating sociograms, comparing overall network measures, conducting *t* tests of egonet measures, and comparing the betweenness centrality of both timepoints. The results of these analytical procedures are described further in the following section.

Maps of the encouragement networks. The sociograms generated to represent the start-of-semester and end-of-semester encouragement ties include all the residents who completed the network surveys or were identified as being a source of encouragement by someone who completed the surveys. Figure 4.7 shows the whole network map of the encouragement ties that students reported during the orientation period of the semester. This baseline network shows that most of the encouragement ties are directed toward two nodes, “Dany” and “Lancel”. The network is not particularly dense, but rather many

nodes only have one or two encouragement ties. Numerous nodes are represented as isolates, and thus these actors do not receive or give encouragement to any other actor in the network.

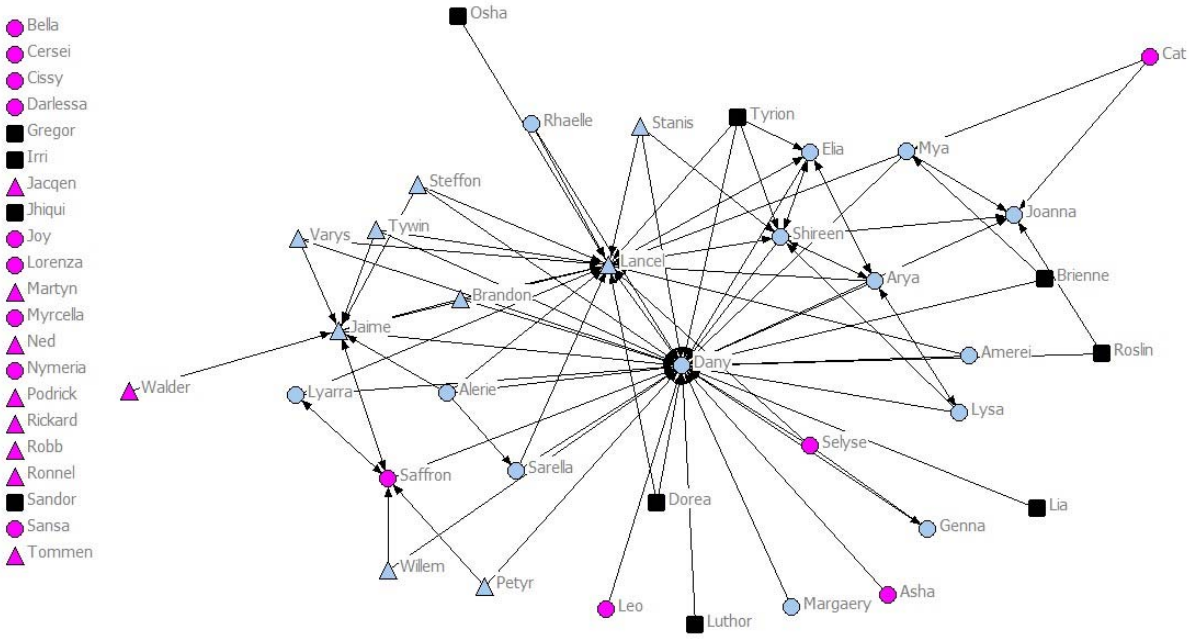

Figure 4.7 Start-of-semester Encouragement Ties within RLC
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Figure 4.8 shows the whole network map of the encouragement ties that students reported during the last weeks of the semester. The ties have shifted around greatly, and the structure of the map is very different from the baseline. This second network noticeably less centralized around the actors “Dany” and “Lancel”, and there are more ties between more actors which makes the network denser. There are fewer isolates in this network, as more actors have developed ties by this point in the semester. However, similar to the

start-of-semester network, numerous students provide encouragement, but do not receive encouragement. Several students provide help to a handful of alters.

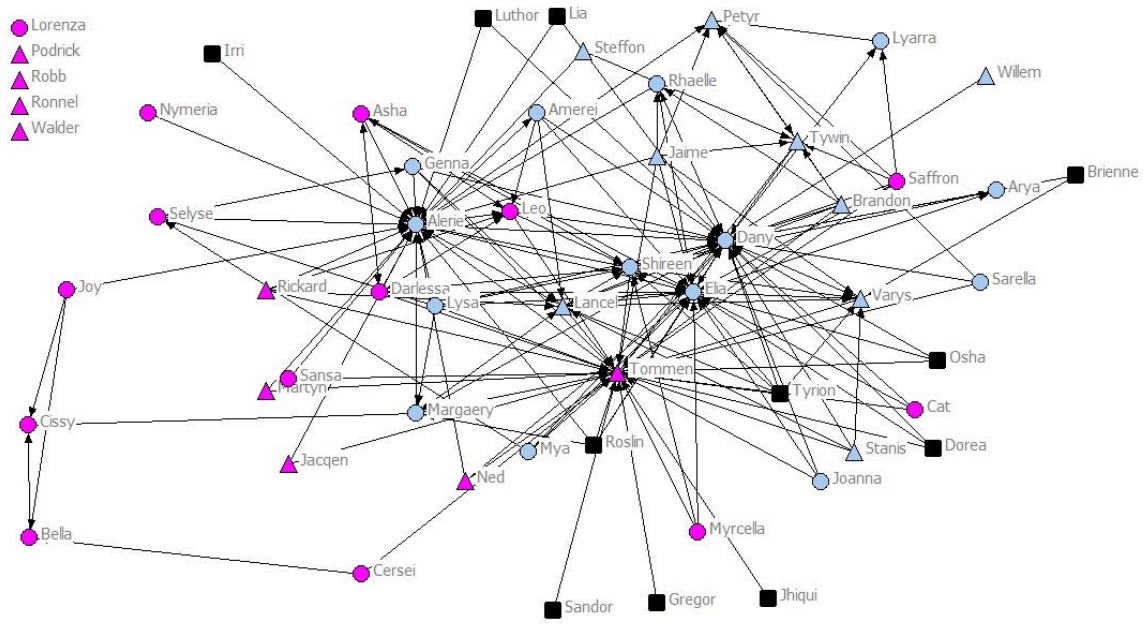

Figure 4.8 End-of-semester Encouragement Ties
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Change in encouragement network density and degree. Change in the encouragement network was further investigated by comparing the network measures of start-of-semester and end-of-semester networks. Using UCINET, multiple measures were calculated to find the overall density of these networks. The end-of-semester network had a greater degree of density. More ties were reported in the second network, and the average degree of friendships were also greater. The differences in these encouragement networks measures are detailed in Table 4.11. This change in density was compared in UCINET

(Network> Compare densities> Paired [same nodes]), and was not found to be statistically significant.

The indegree was then calculated for each actor in the network. As this is a directed network that describes residents giving encouragement to another, indegree is a measure of how many alters gave encouragement to an actor. After the indegree for each actor was calculated for both timepoints in UCINET (Network> Centrality and Power> Degree), the average indegree measures were compared using a paired-sampled *t* test. No statistically significant difference was found in the mean indegrees of the two timepoints. Thus, it cannot be proven that the RLC residents, on average, gained more encouraging relationships by the end of the semester.

Table 4.11

Overall Network Density Measures for Encouragement Networks

	Start-of-semester	End-of-semester
Density	0.03	0.07
Number of ties	87	117
Average degree[3]	1.67	3.40

Change in ego networks within the encouragement network. The ego network density was also calculated for each of the actors in the encouragement networks. For these analyses, an ego network was defined by the outgoing ties, or those who encourage others. The density of the ego networks was then compared with a *t* test to find if there

[3] Average degree reported here is undirected, and is measure of both the outdegree (outgoing ties) and the indegree (incoming ties).

was any significant change between the start and the end of the semester. The analysis found no significant difference between the ego network density at the start of the semester and the end of the semester.

To further investigate how the encouragement networks changed over the course of the semester, the longitudinal change in the ego networks was calculated in UCINET to determine manner in which actors lost or gained ties during the semester. The results of the longitudinal egonet analysis for the encouragement networks are displayed in Table 4.12.

Table 4.12

Longitudinal Egonet Analysis Results for Encouragement within RLC

Resident	Start of Semester Ties	End of Semester Ties	New Ties	Lost Ties	Kept Ties	Never Ties
Alerie	4	6	4	2	2	48
Amerei	2	4	2	0	2	52
Arya	5	2	0	3	2	51
Asha	1	5	5	1	0	50
Bella	0	1	1	0	0	55
Brandon	3	6	4	1	2	49
Brienne	2	2	1	1	1	53
Cat	2	3	3	2	0	51
Cersei	0	2	2	0	0	54
Cissy	0	0	0	0	0	56
Dany	2	9	9	2	0	45
Darlessa	0	6	6	0	0	50
Dorea	2	3	2	1	1	52
Elia	4	5	2	1	3	50
Genna	1	5	4	0	1	51
Gregor	0	1	1	0	0	55
Irri	0	1	1	0	0	55
Jacqen	0	2	2	0	0	54
Jaime	3	7	7	3	0	46
Jhiqui	0	1	1	0	0	55

Table continues

Table 4.12 continued

Resident	Start of Semester Ties	End of Semester Ties	New Ties	Lost Ties	Kept Ties	Never Ties
Joanna	1	3	2	0	1	53
Joy	0	3	3	0	0	53
Lancel	3	7	4	0	3	49
Leo	1	5	5	1	0	50
Lia	1	2	1	0	1	54
Lorenza	0	0	0	0	0	56
Luthor	1	2	1	0	1	54
Lyarra	3	2	1	2	1	52
Lysa	3	7	5	1	2	48
Margaery	1	5	4	0	1	51
Martyn	0	2	2	0	0	54
Mya	3	4	3	2	1	50
Myrcella	0	3	3	0	0	53
Ned	0	3	3	0	0	53
Nymeria	0	1	1	0	0	55
Osha	1	3	3	1	0	52
Petyr	2	1	1	2	0	53
Podrick	0	0	0	0	0	56
Rhaelle	2	3	2	1	1	52
Rickard	0	4	4	0	0	52
Robb	0	0	0	0	0	56
Ronnel	0	0	0	0	0	56
Roslin	2	5	4	1	1	50
Saffron	3	6	4	1	2	49
Sandor	0	1	1	0	0	55
Sansa	0	2	2	0	0	54
Sarella	2	3	2	1	1	52
Selyse	3	2	1	2	1	52
Shireen	5	7	3	1	4	48
Stanis	3	4	2	1	2	51
Steffon	3	3	2	2	1	51
Tommen	0	1	1	0	0	55
Tyrion	4	6	2	0	4	50
Tywin	3	2	1	2	1	52
Varys	3	3	1	1	2	52
Walder	1	0	0	1	0	55
Willem	2	1	0	1	1	54

Change in egonet homophily of encouragement network. For the encouragement networks, an egonet homophily procedure was conducted to measure the residents' tendency to form ties with those of the same scholarship status (Jacobsen Students or non-Jacobsen Students). A Yule's Q was produced for each actor for both timepoints, and the start-of-semester and the end-of-semester measures were compared with a *t* test. The mean Yule's Q at the start of the semester was 0.13 (SD= 0.75). The mean Yule's Q at the end of the semester was 0.11 (SD= 0.73). No significant difference was found between the Yule's Q measures for the start and end of the semester.

Change in betweenness centrality of the encouragement network. For each of the actors in the encouragement network, betweenness centrality was calculated in UCINET to provide an indicator of the actor's importance at the start and the end of the semester. The betweenness centrality measures for each of the residents for both timepoints is displayed for comparison in Appendix B. The most central resident at the start of the semester is "Lancel", who is provided encouragement from numerous sources. At the end of the semester, "Alerie" is the most central by a slight margin because this receives encouragement from numerous sources. Betweenness measures produced for both timepoints were compared with a paired-samples *t* test. No significant difference was found between the residents' centrality measures at the start and end of the semester.

Maps of the validation networks. The sociograms generated to represent the start-of-semester and end-of-semester validating ties included all the residents who completed the network surveys or were identified as being a source of validation by someone who completed the surveys. Figure 4.9 shows the whole network map of the validating ties

that students reported during the orientation period of the semester. This baseline network shows a thick tangle of nodes that provide validation to one another. This tangle is connected to a smaller grouping of nodes through the node “Ned”. The nodes “Irri” and “Nymeria” form a separate grouping amongst themselves, with “Irri” validating “Nymeria” far from the others. There are several isolates in this network, which do not provide or receive validation from any alter.

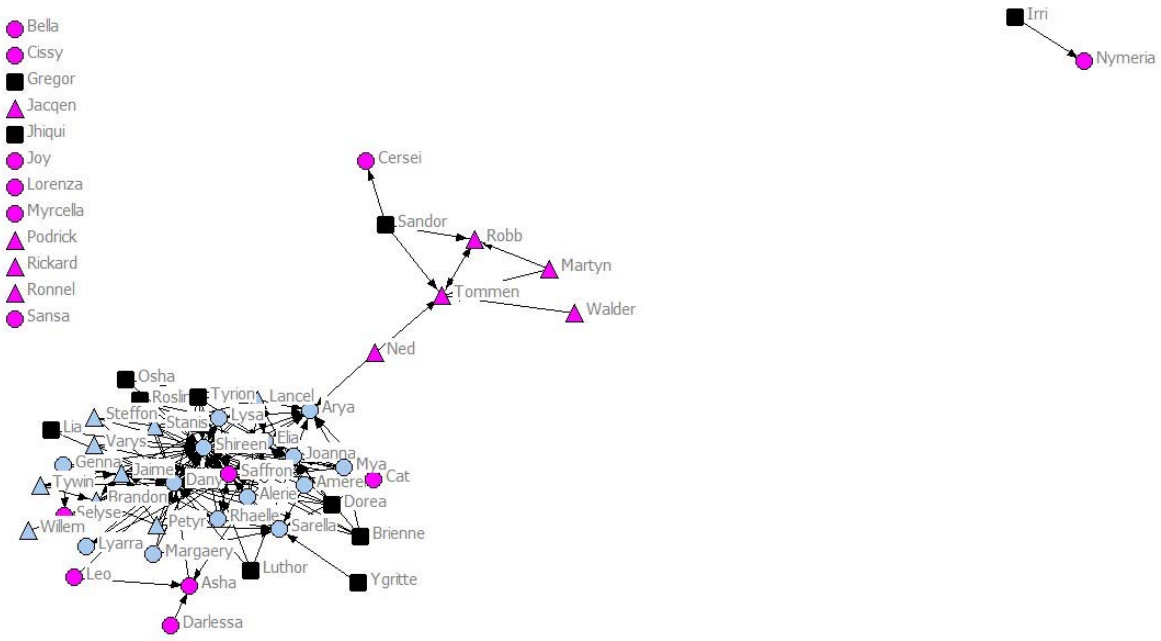

Figure 4.9 Start-of-semester Validation Ties within the RLC
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Figure 4.10 shows the whole network map of the validation ties that students reported during the last weeks of the semester. The structure of the map is noticeably denser and more unified than the baseline. Aside from the isolates, there are not distinct groups amongst the nodes, which form a dense tangle of ties. “Nymeria” and “Irri” are now

separated, both provide validation to another alter. Toward the center of the map, a few nodes appear to receive a great deal of validation in comparison to the other nodes in the network. Most nodes appear to be a source of validation for another. There are fewer isolates in this network, and only three nodes do not provide or receive validation from an alter.

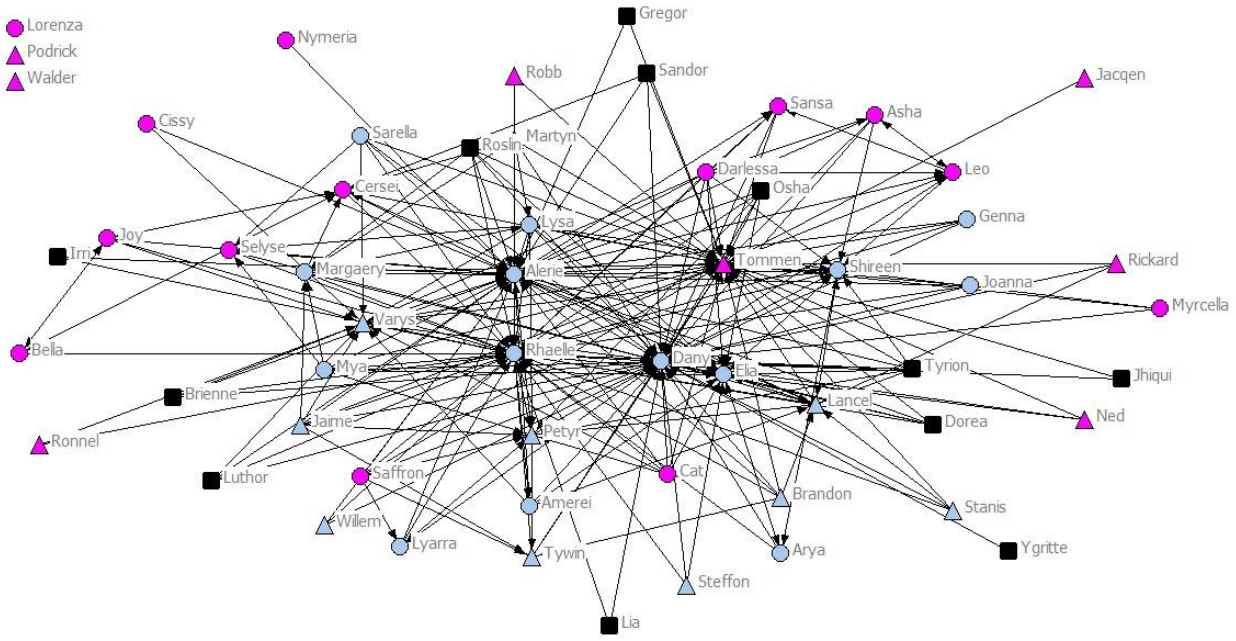

Figure 4.10 End-of-semester validation ties with the RLC
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Change in validation network density and degree. Change in the validation network was further investigated by comparing the network measures of start-of-semester and end-of-semester networks. Using UCINET, multiple measures were calculated to find the overall density of these networks. The differences in these validation networks measures

are detailed in Table 4.13. The change in density was compared in UCINET, and was found to not be statistically significant.

The indegree was then calculated for each actor in the network. Here, indegree can be conceptualized as how many alters validated an actor. After the indegree for each actor was calculated for both timepoints, the average indegree measures were compared using a paired-sampled *t* test. No statistically significant difference was found in the mean indegrees of the two timepoints. Thus, it cannot be proven that the RLC residents, on average, had more or less validation from peers by the end of the semester.

Table 4.13

Overall Network Density Measures for Validation Networks

	Start-of-semester	End-of-semester
Density	0.05	0.08
Number of ties	162	259
Average degree	2.79	4.47

Change in ego networks within the validation network. The ego network density was also calculated for each of the actors in the validation networks. An ego network was defined by the outgoing ties, or those who provide validation to others. The density of the ego networks was then compared with a *t* test to find if there was any significant change between the start and the end of the semester. There was no significant difference

between the ego network densities of the validation network for the start of the semester and the end of the semester.

To further investigate about how the validation networks changed over the course of the term, the longitudinal change in the ego networks compared in UCINET to determine manner of which actors lost or gained ties during the semester. The results of the longitudinal egonet analysis for the validation networks are displayed in Table 4.14.

Table 4.14

Longitudinal Egonet Analysis Result for Validation with RLC

Resident	Start-of-semester Ties	End-of-semester Ties	New Ties	Lost Ties	Kept Ties	Never Ties
Alerie	8	8	5	5	3	44
Amerei	6	6	3	3	3	48
Arya	4	3	1	2	2	52
Asha	1	6	5	0	1	51
Bella	0	3	3	0	0	54
Brandon	3	6	5	2	1	49
Brienne	5	4	3	4	1	49
Cat	6	7	7	6	0	44
Cersei	0	5	5	0	0	52
Cissy	0	2	2	0	0	55
Dany	6	6	5	5	1	46
Darlessa	1	10	9	0	1	47
Dorea	5	5	3	3	2	49
Elia	6	6	1	1	5	50
Genna	3	4	3	2	1	51
Gregor	0	2	2	0	0	55
Irri	1	2	2	1	0	54
Jacqen	0	1	1	0	0	56
Jaime	6	8	6	4	2	45
Jhiqui	0	2	2	0	0	55
Joanna	3	4	3	2	1	51

Table continues

Table 4.14 continued

Resident	Start-of-semester Ties	End-of-semester Ties	New Ties	Lost Ties	Kept Ties	Never Ties
Joy	0	5	5	0	0	52
Lancel	5	8	5	2	3	47
Leo	2	7	5	0	2	50
Lia	2	2	1	1	1	54
Lorenza	0	0	0	0	0	57
Luthor	3	4	3	2	1	51
Lyarra	3	4	3	2	1	51
Lysa	5	10	7	2	3	45
Margaery	4	6	4	2	2	49
Martyn	2	7	6	1	1	49
Mya	5	8	6	3	2	46
Myrcella	0	3	3	0	0	54
Ned	2	3	2	1	1	53
Nymeria	0	1	1	0	0	56
Osha	2	6	6	2	0	49
Petyr	6	4	3	5	1	48
Podrick	0	0	0	0	0	57
Rhaelle	5	4	3	4	1	49
Rickard	0	3	3	0	0	54
Robb	1	3	2	0	1	54
Ronnel	0	2	2	0	0	55
Roslin	4	6	5	3	1	48
Saffron	7	7	4	4	3	46
Sandor	3	4	2	1	2	52
Sansa	0	4	4	0	0	53
Sarella	2	6	5	1	1	50
Selyse	3	3	2	2	1	52
Shireen	7	8	4	3	4	46
Stanis	5	4	2	3	2	50
Steffon	3	3	1	1	2	53
Tommen	1	5	5	1	0	51
Tyrion	5	8	4	1	4	48
Tywin	4	3	2	3	1	51
Varys	4	4	3	3	1	50
Walder	1	0	0	1	0	56
Willem	1	3	2	0	1	54
Ygritte	1	1	1	1	0	55

Change in egonet homophily of validation network. For the validation networks, an egonet homophily procedure was conducted to measure the residents' tendency to validate those of the same scholarship status (Jacobsen Student or non-Jacobsen Student). A Yule's Q was produced for the outgoing ties for each actor for both timepoints, and the start-of-semester and the end-of-semester measures were compared with a paired-samples *t* test., The mean Yule's Q at the start of the semester was 0.20 (SD= 0.77). The mean Yule's Q at the end of the semester was 0.04 (SD= 0.77). There was a significant difference between the Yule's Q from the start of the semester and from the end of the semester, $t(57)= 2.468$, $p= .017$. On average, by the end of the semester, residents validated others in a less homophilous manner with regard to scholarship status.

Change in betweenness centrality of the validation network. For each of the actors in the validation networks, betweenness centrality was calculated to provide an indicator of the actor's importance at the start and the end of the semester. The betweenness centrality measures for each of the residents for both timepoints is displayed for comparison in Appendix B. The most central resident at the start of the semester is "Dany", who provides validation and is validated by many alters. At the end of the semester, "Alerie" is the most central node by a large margin because she receives validation from numerous sources. Centrality measures produced for both timepoints were compared with a paired-samples *t* test. The mean betweenness centrality measures at the start of the semester was 7.76 (SD= 25.14). The mean centrality at the end of the semester was 27.50 (SD= 68.43). A statistically significant difference was found between the means of the centrality

measures, t(57)= -2.26, p= .028. The residents, on average, became more central in the validation network by the end of the semester.

Maps of the academic assistance networks. The sociograms generated to represent the start-of-semester and end-of-semester academic assistance ties include all the residents who completed the network surveys or were identified as providing academic help to someone who completed the surveys. Figure 4.11 shows the whole network map of the academic assistance ties that students reported during the orientation period of the semester. This baseline network is sporadic compared to the maps of the previous networks. Few students identified academic assistance relationships that preexisted the move to the RLC. The majority of the nodes in this network map are isolates, which represents that most of the actors did not provide or receive academic help from any other resident in the RLC.

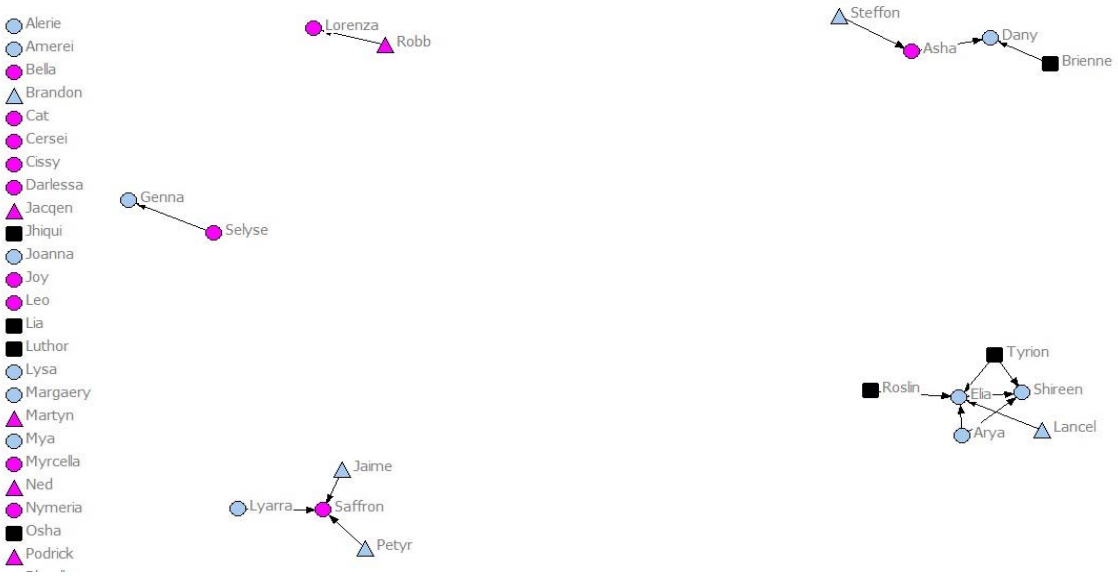

Figure 4.11 Start-of-semester Academic Assistance Ties with the RLC
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Figure 4.12 shows the whole network map of the academic assistance ties that students reported during near the end of the semester. The structure of the map is more interconnected than the baseline. Rather than sporadic groupings, the ties form longer paths. There are fewer isolates in this network; however, the map is not as dense as the friendship or validation network from this time in the semester. The map appears to be very centralized around the nodes “Tommen” and “Alerie”, who receive academic help from numerous sources. The noticeable majority of the nodes provide academic help to one or two alters.

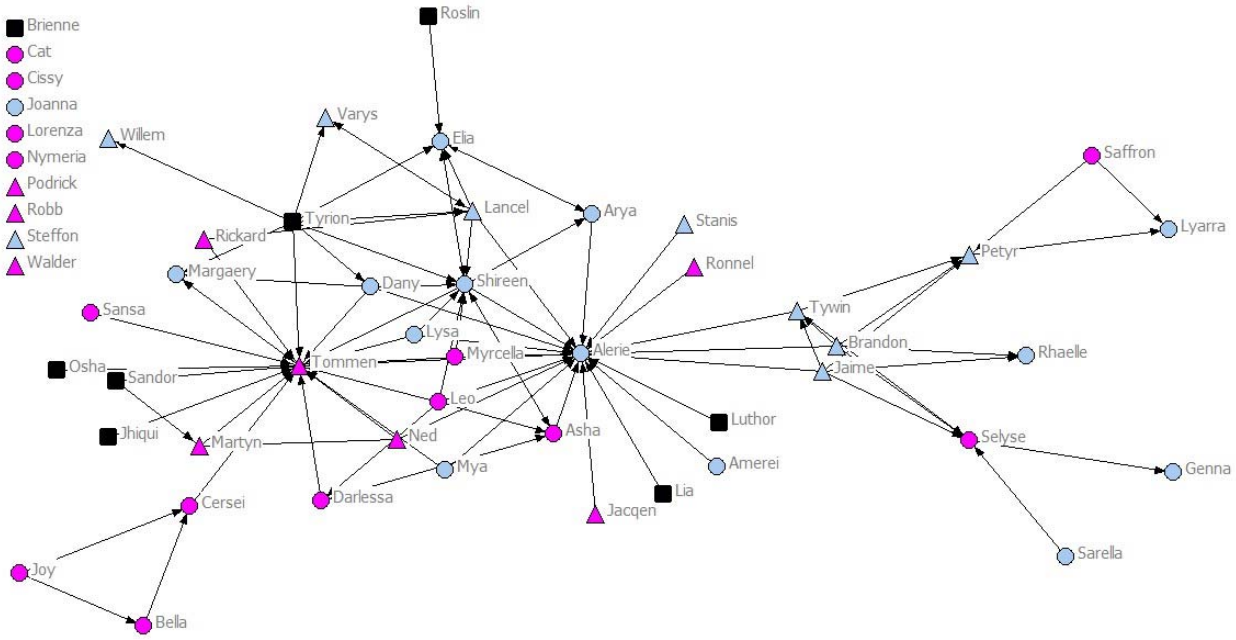

Figure 4.12 End-of-semester Academic Assistance Ties within the RLC
Note: Female residents are represented as circles. Jacobsen Students are represented in gray. Students missing this information are represented as black squares.

Change in academic assistance network density and degree. Change in the academic assistance networks was further investigated by comparing the network measures of start-of-semester and end-of-semester networks. Multiple measures were calculated to find the

overall density of these networks. The differences in these academic assistance networks measures are detailed in Table 4.15. The change in density was compared in UCINET with the compare densities function bootstrapped to 10,000 samples, and the increase in density was found to be statistically significant, t(-0.025), p=.016. The academic assistance relationships amongst residents became more interconnected by the end of the term.

The indegree was then calculated for each actor in the network. Indegree can be conceptualized as how many alters provided academic help to an actor. After the indegree for each actor was calculated for both timepoints in UCINET, the average indegree measures were compared using a t test. The difference between the mean indegree for the start of the semester (M= 0.31; SD= 0.92) and the end of the semester (M= 1.61, SD= 3.72) was found to be statistically significant, t(53)= -2.622, p=.011. Thus, RLC residents, on average, received more academic help from peers by the end of the semester.

Table 4.15

Overall Network Density Measures for Academic Assistance Networks

	Start-of-semester	End-of-semester
Density	0.01	0.03
Number of ties	16	87
Average degree	0.30	1.61

Change in ego networks within the academic assistance networks. The ego network density was calculated for each of the actors in the academic assistance networks. The densities of the ego networks were then compared with a *t* test to find if there was any significant change between the start and the end of the semester. For these analyses, an ego network was defined by the outgoing ties. The results showed a statistically significant difference between the ego network density of the academic assistance network for the start of the semester (M= 0.05, SD= 0.19) and the end of the semester (M= 0.18, SD= 0.20), $t(53)= -3.798$, $p \leq .001$. The ego networks of the RLC residents were, on average, denser at the end of the semester than at the start.

The longitudinal change in the ego networks was then compared in UCINET to determine manner of which actors lost or gained academic assistance ties during the semester. The results of the longitudinal egonet analysis for the friendship networks are displayed in Table 4.16.

Table 4.16

Longitudinal Egonet Analysis Results for Academic Assistance with RLC

Resident	Start-of-semester Ties	End-of-semester Ties	New Ties	Lost Ties	Kept Ties	Never Ties
Alerie	0	0	0	0	0	53
Amerei	0	1	1	0	0	52
Arya	2	2	1	1	1	50
Asha	1	3	3	1	0	49
Bella	0	1	1	0	0	52
Brandon	0	5	5	0	0	48
Brienne	1	0	0	1	0	52
Cat	0	0	0	0	0	53
Cersei	0	1	1	0	0	52

Table continues

Table 4.16 continued

Resident	Start-of-semester Ties	End-of-semester Ties	New Ties	Lost Ties	Kept Ties	Never Ties
Cissy	0	0	0	0	0	53
Dany	0	4	4	0	0	49
Darlessa	0	2	2	0	0	51
Elia	1	2	1	0	1	51
Genna	0	0	0	0	0	53
Jacqen	0	1	1	0	0	52
Jaime	1	5	5	1	0	47
Jhiqui	0	1	1	0	0	52
Joanna	0	0	0	0	0	53
Joy	0	2	2	0	0	51
Lancel	1	4	3	0	1	49
Leo	0	5	5	0	0	48
Lia	0	1	1	0	0	52
Lorenza	0	0	0	0	0	53
Luthor	0	1	1	0	0	52
Lyarra	1	0	0	1	0	52
Lysa	0	3	3	0	0	50
Margaery	0	1	1	0	0	52
Martyn	0	1	1	0	0	52
Mya	0	2	2	0	0	51
Myrcella	0	3	3	0	0	50
Ned	0	3	3	0	0	50
Nymeria	0	0	0	0	0	53
Osha	0	1	1	0	0	52
Petyr	1	1	1	1	0	51
Podrick	0	0	0	0	0	53
Rhaelle	0	0	0	0	0	53
Rickard	0	2	2	0	0	51
Robb	1	0	0	1	0	52
Ronnel	0	1	1	0	0	52
Roslin	1	1	0	0	1	52
Saffron	0	2	2	0	0	51
Sandor	0	2	2	0	0	51
Sansa	0	1	1	0	0	52
Sarella	0	1	1	0	0	52
Selyse	1	1	0	0	1	52
Shireen	1	5	4	0	1	48

Table continues

Table 4.16 continued

Resident	Start-of-semester Ties	End-of-semester Ties	New Ties	Lost Ties	Kept Ties	Never Ties
Stanis	0	1	1	0	0	52
Steffon	1	0	0	1	0	52
Tommen	0	2	2	0	0	51
Tyrion	2	8	6	0	2	45
Tywin	0	3	3	0	0	50
Varys	0	1	1	0	0	52
Walder	0	0	0	0	0	53
Willem	0	0	0	0	0	53

Change in egonet homophily of academic assistance networks. For the academic assistance networks, an egonet homophily procedure was conducted to measure the residents' tendency to validate those of the same scholarship status (Jacobsen Student or non-Jacobsen Student). A Yule's Q was produced for the outgoing ties for each actor for both timepoints, and the start-of-semester and the end-of-semester measures were compared with a *t* test. The mean Yule's Q at the start of the semester was -0.04 (SD= 0.51). The mean Yule's Q at the end of the semester was -0.01 (SD= 0.72). There was no statistically significant difference between the Yule's Q from the two timepoints.

Change in betweenness centrality of the academic assistance network. For each of the actors in the academic assistance networks, betweenness centrality was calculated in UCINET to provide an indicator of the actor's importance within the network at the start and the end of the semester. The betweenness centrality measures for each of the residents for both timepoints is displayed for comparison in Appendix B. At the start of the semester, the betweenness centrality measures were very low. As the network is very sparse, the most central node is "Elia" with a measure of 2. At the end of the semester,

"Shireen" is the most central node because she receives and provides assistance to several alters. Centrality measures produced for both timepoints were compared with a paired-samples *t* test. The mean betweenness centrality measures at the start of the semester was 0.06 (SD= 0.30). The mean centrality at the end of the semester was 2.54 (SD= 8.15). A statistically significant difference was found between the means of the centrality measures, t(53)= -2.26, p= .028. The residents, on average, became more central in the academic assistance network by the end of the semester.

Impact of participation, friendships, and study partnerships on support networks

MR-QAP results for the encouragement network. The MR-QAP for end-of-semester encouragement network was run with 10,000 permutations in UCINET. This network was set as the dependent variable for the model, and the independent variables included the following: 'same sex as' matrix, 'same race as' matrix, 'same scholarship status as' matrix, 'same major as' matrix, 'same connected course enrollment as' matrix, 'absolute difference in non-RLC friends' matrix, 'absolute difference in non-RLC study partners' matrix, 'difference in event participation' matrix, the end-of-semester friendship partnership network, and the end-of-semester study partnership matrix. The start-of-semester encouragement matrix was also included to control for the influence of residents' preexisting encouraging relationships. The results of the regression are summarized in Table 4.17.

Table 4.17

Encouragement MR-QAP Results

Variable	Encouragement Model	SE
Same Sex As	0.015*	0.008
Same Race As	0.002	0.011
Same Scholarship Status As	0.008	0.008
Same Major As	-0.015	0.011
Same Connected Course Enrollment As	-0.001	0.010
Absolute Difference in Non-RLC Friendships	-0.000	0.001
Absolute Difference in Non-RLC Study Partnership	-0.000	0.004
Same Event Participation As	0.009	0.014
Friendships at End of Semester	0.141***	0.016
Study Partnership at End of Semester	0.271***	0.021
Encouragement Network at Start of Semester	0.366***	0.046
R-squared	0.280***	

*p< 0.05, **p<0.01, ***p<0.001

The model had a significant *R*-squared of 0.280, meaning that the model explained 28.0% of the variance amongst the end-of-semester encouragement dyads. The coefficients for ‘same race as’, ‘same scholarship status as’, ‘same major as’, and ‘same connected course enrollment as’ were not significant, indicating that being the same race, major, scholarship status, or connected course enrollment status did not have a significant impact on the number of encouraging relationships one would observe in any batch of 1000 dyads. The variable for ‘absolute difference in non-RLC friendships’ and ‘absolute difference in non-RLC study partnerships’ also were not significant. Thus, the absolute difference in the number of outside friends and study partners did not have a significant impact on the number of encouraging relationships observed in a batch of 1000 dyads. Similarly, the ‘difference in event participation’ was not significant. The ‘same sex as’

variable did have a significant coefficient of 0.015. One would see about 15 additional cases of encouraging relationships in a batch of 1000 dyads where *i* is the same sex as *j*. The end-of-semester friendship network had a statistically significant coefficient of 0.141. This result means that when *i* and *j* are friends at the end of the term, one would expect to see about 141 more instances of encouraging relationships in any batch of 1000 dyads. The end-of-semester study partnerships was also statistically significant with a coefficient of 0.271. One would observed about 271 additional instances of encouraging relationships in a batch of 1000 dyads when *i* and *j* studied together at the end of the term. The start-of-semester encouragement relationships had a statistically significant coefficient of 0.366. Thus, one would observe about 366 additional instances of encouraging relationships in a batch of 1000 dyads when *i* encouraged *j* at the start of the semester.

MR-QAP results for the validation network. The MR-QAP for end-of-semester validation network was run with 10,000 permutations in UCINET. The independent variables were the same as those used for the encouragement model, except the start-of-semester validation network was used as a control. The results of the MR-QAP are summarized in Table 4.18.

Table 4.18

Validation MR-QAP Results

Variable	Validation Model	SE
Same Sex As	0.010	0.011
Same Race As	0.010	0.018
Same Scholarship Status As	0.009	0.012

Table continues

Table 4.18 continued

Variable	Validation Model	SE
Same Major As	-0.026	0.017
Same Connected Course Enrollment As	0.004	0.016
Absolute Difference in Non-RLC Friendships	-0.001	0.001
Absolute Difference in Non-RLC Study Partnership	0.009	0.007
Same Event Participation As	0.020	0.024
Friendships at End of Semester	0.182***	0.024
Study Partnership at End of Semester	0.222***	0.026
Validation Network at Start of Semester	0.200***	0.048
R-squared	0.220***	

*p< 0.05, **p<0.01, ***p<0.001

The model had a significant *R*-squared of 0.220, and thus explained about 22.0% of the variance amongst the end-of-semester validation dyads. Only three variables had a statistically significant predictive ability in the model. The end-of-semester friendship network had a statistically significant coefficient of 0.182, meaning there would be about 182 more observations of validating relationships when *i* and *j* are friends at the end of the term. The end-of-semester study partnerships network had a statistically significant coefficient of 0.222, meaning there would be about 222 more observations of validating relationships when *i* and *j* studied together at the end of the term. The start-of-semester validation relationships had a statistically significant coefficient of 0.200. Thus, one would observe about 200 additional instances of validating relationships in a batch of 1000 dyads when *i* validated *j* at the start of the semester.

MR-QAP results for the academic assistance network. The MR-QAP for end-of-semester academic assistance network was also run with 10,000 permutations in

UCINET. The independent variables were the same as those used for the encouragement and validation model, except the start-of-semester academic assistance network was used as a control. The results of the MR-QAP are summarized in Table 4.19.

Table 4.19

Academic Assistance MR-QAP Results

Variable	Academic Assistance Model	SE
Same Sex As	-0.003	0.005
Same Race As	0.003	0.007
Same Scholarship Status As	0.008	0.006
Same Major As	-0.001	0.008
Same Connected Course Enrollment As	-0.004	0.006
Absolute Difference in Non-RLC Friendships	0.000	0.000
Absolute Difference in Non-RLC Study Partnership	-0.003*	0.003
Same Event Participation As	0.005	0.009
Friendships at End of Semester	0.049***	0.009
Study Partnership at End of Semester	0.331***	0.016
Academic Assistance Network at Start of Semester	0.293***	0.038
R-squared	0.230***	

*p< 0.05, **p<0.01, ***p<0.001

The model had a significant *R*-squared of 0.230, and thus explained about 23.0% of the variance amongst the end-of-semester academic assistance dyads. Five variables had a statistically significant impact on the model. The significant coefficient for 'absolute difference in non-RLC study partnerships' indicates that for every one unit increase in the absolute difference in the number of outside RLC study partners reported by *i* and *j*, the dependent variable will decrease of 0.003 units on average. The end-of-semester friendship network had a statistically significant coefficient of 0.049, meaning

there would be about 49 more observations of assistance relationships when *i* and *j* are friends at the end of the term. The end-of-semester study partnerships network also had a statistically significant coefficient of 0.331, meaning there would be about 331 more observations of assistance relationships when *i* and *j* studied together at the end of the term. The start-of-semester academic assistance relationships had a statistically significant coefficient of 0.293. Thus, one would observe about 293 additional instances of validating relationships in a batch of 1000 dyads when *i* helped *j* at the start of the semester.

Summary

This chapter presented the results of a series of social network analysis (SNA) procedures used to assess the differences between RLC residents' networks at the start and the end of the semester. Using the data derived from network surveys, descriptives of the RLC population were attained and presented. The start-of-semester and end-of-semester sociograms of the friendship and study partnership relationships were presented for longitudinal comparison. The results of *t* tests comparing these networks' density, degree, egonet density, egonet homophily, and betweenness centrality measures were discussed and interpreted. The results of the MR-QAP of these networks were also presented. Similarly, the start-of-semester and end-of-semester sociograms of the support networks were presented for comparison. The results of *t* tests comparing the density, degree, egonet density, egonet homophily, and betweenness centrality measures of the RLC's start-of-semester and end-of-semester encouragement networks were presented and interpreted. The same was done for the RLC residents' validation networks and academic assistance networks. The findings derived from the MR-QAPs of the support

networks were also discussed to describe the impact of the RLC programming on residents' relationships. The final chapter will review the findings as they relate to the research questions. Further, the next chapter will propose how this study demonstrates the potential of SNA to expand educational program evaluation.

CHAPTER V:

Discussion, Conclusions, and Implications for Future Research

The purpose of this study was to develop a methodology for examining the peer involvement and supportive relationships within first-generation RLCs, and to pilot this methodological process. Previous works have explored college student development within RLCs (e.g. Inkelas et al, 2007; Pasque & Murphy, 2005; Smith, 2015; Stassen, 2003; Wottenburg, 2014); however, these explorations have not been extended to exclusively first-generation RLCs. As first-generation college students' challenges and socialization are unique compared to those of their continuing-generation peers, different considerations must be made when developing protocols for these programs. Thus, this study created network surveys specific to the supportive relationships that encourage first-generation persistence, and applied social network analysis (SNA) to determining how a semester in a first-generation RLC impacted peer relationships.

This study discussed the literature regarding first-generation students, with particular focus on how the attrition rates for this group are notably higher than those of continuing-generation students. The second chapter of this dissertation also introduced student development theories, including Tinto's student integration model, Bean's student attrition model, and Astin's student involvement theory. Building on the discussion of student development theories, the relationships presumed to bolster first-generation college persistence were detailed. The program design and processes of college RLCs were then discussed, and the rise of first-generation RLCs (and the arguments of their detractors) were described. Social network theory and the application

of social network analysis (SNA) in educational research were also detailed so to introduce the methodological techniques used in this study.

Following the discussion of the purpose of this study and the literature, the methodology used to elicit network data from the students, define the peer relationships that existed within the participating RLC, and determine the changes in residents' social involvement were detailed. The findings of the derived from the sociograms, comparisons of whole network and ego network measures, and MR-QAP hypothesis testing procedure were also described. This chapter will recapitulate the research objectives of this study, and will discuss how the results of the analyses answered them. This final chapter will also recommend how the social network analysis methods used for this study can be extended to future research, and help institutions of higher education improve their outreach for first-generation students.

Research Questions and Findings

The research questions that guided this study were intended to create an archetype for how first-generation RLCs can use SNA to investigate the changing peer involvement amongst students. Further, pursuing these research questions provided the opportunity to pilot a social network oriented survey instrument and procedure specifically designed to examine peer networks of first-generation students. This section summarizes how the findings of this study addressed each of the four guiding research questions.

1) *How do first-generation RLC students' friendships and study partnerships change during the first semester of enrollment?*

Possible change in the friendships and study partnerships within Prime Scholars was explored because this was a concern of the RLC, and these relationships indicate a degree of peer involvement. The analysis of change in friendships and study partnerships began by generating sociograms for both the start and the end of the residents' first term. As seen in the visible depictions of the friendship ties, which can be seen in Figure 4.1, a central cluster of residents matriculated into the RLC with dense friendships, while those on the periphery of the network only reported one or two preexisting friendships. This may be due to several students coming from the same high school, or being friends on social media. The map of end-of-semester friendships shows that, as a whole, the networks became visibly denser as more ties crisscrossed between residents. Residents who originally had only one or two ties, now have four or more. This map provided a tangible indicator that friendships became more numerous during the first semester within Prime Scholars.

The sociogram of study partnerships from the start of the term show an interesting networks structure, which can be seen in Figure 4.3. The ties form a sunburst pattern around a single node, "Dany". This implies that "Dany" is a member of nearly all of the start-of-semester study partnerships. As "Dany" had a high degree friendship of ties at start of the semester, the structure may possibly result of "Dany" meticulously endorsing all of her past study partners while her peers completed their surveys less diligently. However, given that how atypical her responses were, this could have been an example of commission error adding nonexistent ties to the network. The map is noticeably sparse, and many residents reported no study partners, which is not surprising given that it is that start of the term. When "Dany was excluded from the network to explore the

vulnerability of the data, this network map was even sparser, made of several small components. For the end of the semester shown in Figure 4.4., the map is still sparse when compared with the friendship network from this time. The structure no longer revolves around a single individual, but rather there is now a distinct series of paths along which information can flow. The RLC could use these paths to disperse information about courses or exam prep opportunities. However, there are several students without study partners within the community, and the administration should revisit why so many residents are not involved.

The next procedure for finding change in residents' friendships and study partnerships with calculating the whole network densities and degree for these networks at both timepoints. A density comparison procedure found that the friendship network was significantly greater at the end of the semester, meaning that the residents shared more ties amongst themselves at the end of their first term. A *t* test comparison of the mean degrees also found a significant increase, meaning that on average residents had more friends at the end of the term. The change in density for study partnerships, though, was not statistically significant. Further, the *t* test found that on average residents did not experience any significant change to the number of study partners they had during the semester. Thus, at the whole network level, residents formed more interconnected friendships within the RLC, but change in the cohesiveness and degree of study partnerships could not be determined. When the respondent "Dany" was excluded, however, a significant change was found in the study partnerships.

The ego networks of these networks were explored to find how the network changed at the personal level. The mean density of the ego networks at the start and end of the

term were compared for both relationships using paired-samples *t* tests. There was no significant change in the mean ego network densities for friendships, nor for study partnerships. To state alternatively, on average, there was no change in the number of an actor's friends who became friends with one another, nor the number of study partners that began to study with one another. And thus, there no change in the constraints on residents' ability to spread information through their friends and study partners. This finding is concerning because denser ego networks mean that residents gain information about courses, deadlines, and events easier. As the friendships and study partnership did not spread, it would be difficult for the information that typically travels via those ties to spread, too.

Longitudinal egonet analysis provided more details about how each of the residents' friendships and study partnerships changed during their first semester, and these results are shown in Tables 4.7 and 4.8, respectively. Both friendships and study partnerships can be characterized as complex shifting relationships, rather than as simply growing. While residents reported 7.83 new friendships at the end of the semester (this figure differs from the change in average degree reported earlier because average degree is derived from the average sum of all ties), they also lost an average of 4.51 friendships and never formed friendships with an average of 39.46 of their peers. For study partnerships, residents formed 1.82 new ties on average, lost 1.46 on average, and never studied with an average of 51.46 of their peers. Residents' apparent loss of friends and study partners may arise of measurement error resulting from participants not responding to the network survey items appropriately, or form the missing responses of some residents. However, future iterations of this study could pinpoint if these findings were

due to error or issues with the RLC. The Prime Scholars community may benefit from investigating why the residents lose friends and study partners within the span of one semester, and determine if this results from measurement error, natural growing apart, or disputes that the community could resolve. Prime Scholars should particularly examine why their residents never formed friendships or study partnerships with so many of their RLC peers, especially given the resources spent on study nights and social programs. When first-generation students enter college, they are hampered by knowing few people with whom to socialize and study. Any effort to remove barriers to interacting with others within the RLC would greatly help these students have an equitable experience.

A concern unique to this RLC is that administrators feared that merit scholarship students, or Jacobsen Students, that lived within the community may not interact with residents who did not belong to this scholarship cohort. Given this concern, the change in the ego network homophily of scholar status was explored for friendships and study partnerships. For friendships, students on average were slightly homophilous at the start and the end of the semester. Residents' mean homophily measures experienced no significant change. For study partnerships, residents started off as slightly homophilous toward those within the same scholarship status, but ended the semester as slightly heterophilous. As difference in these means was statistically significant, these measures show that residents developed a mild preference for studying with those outside of their scholarship cohort while living in the RLC. This may be due to Jacobsen Students, who are high achievers, extending academic help to non-Jacobsen Students. Although the friendship networks did not display the same positive change as the study partnerships, the homophilous tendency of friendships is low and not concerning.

The final procedure for exploring the change in the residents' friendships and study partnerships was comparing the residents' betweenness centrality. Betweenness centrality was used as an indicator of power within the networks. There were noticeable shifts in who was the most central, or powerful, resident. Amongst the friendships, "Elia" was the most important resident to start, but "Dany" became the most important as her centrality climbed while "Elia's" dwindled. Similarly, "Dany" was the most central resident in the network of study partners at the start of the term, but "Tommen" became the most important as more study partnerships developed during the semester. The RLC can learn from this finding that the most central students at the start on the semester will likely not hold that role for the term. Thus, the residents that have the greatest ability to disperse information through the community will shift. Another set of *t* tests found that that the mean betweenness centrality for friendships did not significantly change during the term, but the mean centrality for study partnerships did significantly increase. Thus, residents on average became more influential and developed more expansive study partnerships, rather than being withdrawn as characterized in the literature (Pike & Kuh, 2005). The RLC could build upon this shift by encouraging residents to study with even more peers, particularly those whom they did not know very well. .

Summary of change in friendships and study partnerships. The residents of Prime Scholars did form more friendships during their first term, and the density of this network became more cohesive, as anticipated at the start of this study. However, change in many aspects of this network were stagnant. Residents did not appear to successfully encouraged more of their friends to become friends with each other, nor did they significantly change their tendency to befriend those of the same scholarships status.

Further, the residents did not become notably more centrally involved in friendships. RLC residents changed their preference in study partners, and became more central in their involvement in this relationship. However, residents did not develop more study partnerships or become more interconnected with their study partners, which is a severe deficiency in students' peer involvement during the semester. The modest change in these networks is an important finding for the RLC because it shows that the peer involvement of the residents is not increasing as much as expected, given the social focus of this program. However, it is important to note that when "Dany's" atypical responses were excluded from the analyses, more instances of change were found in the study partnership network. Not enough is known about the respondent's intentions to confirm whether this is an example of commission error; but if such an error occurred, then it did affect whether change was observed in the network. Regardless of the possibility of commission error, the methods described in this study provided copious details about students' connections with peers, or lack thereof, which the RLC's usual evaluation procedures would have taken for granted. With these results, Prime Scholars can better plan future interventions to foster involvement, and other first-generation programs can follow these methods to acquire similar information about their participants.

2) *How is participation in RLC programming associated with the end-of-semester friendships and study partnerships of first-generation students?*

This research question was pursued because the study intended to demonstrate how a first-generation RLC could test if participation in their programming had an impact on the peer involvement that occurred within their community. To determine if participation

in the Prime Scholars events and classes influenced the number of friendships and study partnerships residents were involved with at the end of the term, an MR-QAP was conducted for each network.

Impact on friendships. When the end-of-semester friendships were tested, the variables included in the model explained about 22.8% of the variance. This is a notable amount given that the *R*-squared in MR-QAPs tends to be deceptively low (Borgatti, Everett, & Johnson, 2013), yet it shows that not everything tested in the model could explain residents' friendships. Of the variables tested, being of the same sex was found to influence the friendship ties, with more friendships being observed if residents were of both male or both female. Being study partners at the end of the semester was also found to greatly increase the number of friendships observed. Thus, developing study partnerships is an important factor in determining if residents will develop friendships with peers. The start-of-semester friendship network also impacted the model, with more friendships being observed at the end of the term if residents were friends at the start of the term. However, the impact of this was not as strong as that of the study partnership network. Given that very little change occurred in the study partnerships during the semester, these results show that this is a missed opportunity for the RLC. If the administration could encourage more study partnerships within the community, then students would likely develop a great deal more friendships amongst peers.

To measure the impact of community participation, connected course enrollment and shared event participation were tested in the model. Being in a connected course together was not found to influence the friendship ties observed, nor was such a result found for participating in the same events Therefore, judging from the information yielded by these

results, the assumptions made before this study were incorrect. Shared participation in events and connected course enrollment do not appear to meaningfully predict residents' friendships. Preexisting friendships and end-of-semester study partnerships are the best indicators of this type of peer involvement. As the first-generation RLC is a socially-oriented program, this is valuable input that would have been missed if the community had pursued traditional evaluative methods, such as comparing GPAs, and not explored friendships.

Impact on study partnerships. When the end-of-semester study partnerships were tested, the variables included in the model explained about 10.4% of the variance. Thus, much of how residents were partnered together could not be explained by the model, and warrants future investigation. Of the attributes tested, being of the same major was found to have a significant influence on the study partnerships reported at the end of the semester. More study partnerships were observed when residents belonged to the same major. While it was not a large increase in observed relationships, it was understandable students would possibly gain more benefit from studying with someone on the same course plan. This finding may offer a means for the RLC to increase the study partnerships occurring in the community, as the administrator could match students with those belonging to the same major. Residents' friendships at the end of the term had a statistically significant influence on the study partnerships, with more study partnerships being observed at the end of the semester when residents were friends. This indicates that the community could expand the study partnership network by fostering friendships. Surprisingly, the study partnerships at the start of the term had no significant impact on the partnerships at the end of the semester. This likely means that residents generally

changed who they studied with throughout the semester, and thus the preexisting partnerships could not predict the end of term relationships.

Shared connected course enrollment and shared event participation did not impact the study partnerships observed at the end of the semester. The findings of the MR-QAP imply that this study's anticipations were incorrect, and that the RLC programming was not predictive of the peers with whom residents studied. This implication is concerning, as residents' study partnerships changed very little during the semester, and the RLC hosts peer tutoring sessions throughout the term. The RLC may benefit from developing more compelling interventions to encourage residents to study with peers.

Summary of the impact of participation on friendships and study partnerships. For both the friendships and the study partnerships reported at the end of the semester, shared participation in the RLC did not predict residents' relationships. This is a troublesome finding for the Prime Scholars community because the program seeks to build students' peer involvement in order to imbedded them into campus life and improve their chances of finishing college, as recommended by Astin (1999). For these two types of peer involvement, the activities that students participated in together did not make much of a difference, despite the community's investment in social events and peer tutoring sessions. What did influence residents' peer involvement were conditions that could be described as unprompted occurrences within the RLC. The most notable finding was how strongly study partnerships influenced the presences of friendship ties, especially because of the limited changes the study partnership network underwent during the term. The RLC would likely benefit greatly by redirecting efforts to getting more students to study together and building the cohesiveness of that relationship, possibly by assigning rotating

study groups at matriculation. By more directly fostering peer involvement through study partnerships, the RLC could more easily increase involvement in friendships than what was possible with the connected courses and events.

3) *How does the structure of supportive peer networks change during the first semester of enrollment?*

Encouragement networks. Encouraging relationships were included in this pilot because encouragement has been shown to boost the college persistence of first-generation students (Cabrera et al., 1993; Nora et al., 1990; Strauss & Volkwein, 2004). Thus, change in this relationship was relevant to determining if the residents' experiences within the RLC fostered persistence through the first semester. Investigating change in the encouragement networks began with creating sociograms for both the start and the end of the first term. The map for the preexisting encouragement network, which can be seen in Figure 4.5, showed that most of the encouragement in the network was given to two residents, "Lancel" and "Dany". This network did not show the density of the friendship networks, and most residents only provided or received encouragement form one or two peers. A large portion of the residents did not receive or provide encouragement to anyone. Although most residents entered the RLC with friends, these friends did not necessarily provide encouragement to attend the university. The map of end-of-semester encouragement network shows that more encouragement was extended to others and new ties developed. Only a few residents are not involved in the exchange of encouragement. The map is denser because of the new ties, but again, not as dense as the friendship networks. Further, given that providing encouragement is a directed

relationship, many of the residents cheered on their peers, but were not encouraged themselves. With this map, the RLC administration can target their efforts to fill in that encouragement gap, and step in to encourage the emotional "cheerleaders" of the community who may not be getting a return on their empathy.

Next, change in the encouragement networks was explored by calculating the whole network densities and degrees at both timepoints, which is summarized in Table 4.11. The densities were compared in UCINET, and no statistically significant difference was found between the two networks. Therefore, the residents did not become significantly more cohesive in their encouragement ties, as hoped by the RLC's administrators. As these supportive ties did not become denser, there was not an increase the network's potential to provide encouragement to residents throughout the RLC. A comparison of the mean indegree for both the start and end of the term found that students did not have a significant change in the number of peers providing them with encouragement. Therefore, despite the social events, experiential learning outings, and the consistent records of higher than average achievement, this methodology uncovered that the students are not being connected to additional sources of encouragement while in the RLC. Given that encouragement is an important resource for pushing first-generation students to reach graduation, this finding is crucial and indicates that the community needs to build this network.

The ego networks of these networks were explored to find how the network changed at the personal level. The mean density of the ego networks at the start and end of the term were compared, and no significant change was found for the encouragement relationships. Essentially, the encouragers within an actor's personal network did not

begin to encourage any more alters. Thus, there was no change in the constraints on residents' to spread encouragement or other messages through their personal networks. This was not unexpected given the lack of change the whole network density and degree. However, this shows that encouragement become did not spread, even within the small networks.

Longitudinal egonet analysis provided more details about how each of the residents' encouragement relationships changed during their first semester. As shown in Table 4.12, the encouragement network experienced many shifts, but not as pronounced as those seen in the RLC friendships and study partnerships. On average, residents encouraged 2.30 additional peers by the end of the semester, stopped encouraging 0.72 peers, and never encouraged 52.18 of their peers. The Prime Scholars RLC may wish to explore strategies to inspire residents to encourage more peers, or communicate the importance expressing support for others' goals.

Given the administrators' concerns that Jacobsen scholarship students would not interact with residents outside their cohort, the change in the ego network homophily toward scholar status was explored for encouragement relationships. Students on average were slightly homophilous at the start and the end of the semester. Residents' mean homophily measures experienced no significant change. Although, the residents' tendency to encourage those of the same scholarship status did not change, the homophily was not great enough to be worrisome.

The final procedure for exploring the change involved the betweenness centrality measures of the encouragement networks. Of the actors, "Lancel" was the most central, or powerful, resident at the start of the semester because he provided many peers with

encouragement. At the end of the semester, “Alerie” was the most central because she received encouragement from many sources. A set of *t* tests found that that the mean centrality did not significantly change during the term. Residents’ may not have significantly shifted in centrality because there was not strong growth in the encouragement experienced throughout the network.

Validation networks. Validating relationships were included in this pilot because validation from others has been shown to make first-generation students feel that college was the right decision, and fosters college persistence (Garriott et al., 2015; Terenzini et al., 1994). Sociograms for both the start and the end of the first term were generated, and the map for the preexisting validation network is shown in Figure 4.7. This sociogram depicts a dense cluster of residents who exchange validation greatly. However, the rest of the map is sparse, and there are several isolates. If an individual was not a part of the dense grouping, he/she was not particularly involved in exchanging validation. This disconnection in the validation network may be due to several students knowing each other through high school or social media, while other students did not know anyone and had yet formed relationships. The map of end-of-semester validation network shows a much more cohesive network, similar to the friendship network from this point in the semester. There are only three individuals who do not give or receive validation, and most student validate several peers. Again, with this map, the RLC administration can target their efforts, validating not only the isolated students, but also those that validate others but are not validated themselves.

Change in the validation networks was then explored by calculating the whole network densities and degrees at both timepoints, which are described in Table 4.13. The

densities were then compared, but no statistically significant difference was found, meaning that the residents did not become much more cohesively tied to one another at the end of their first term. The residents' mean degrees were also compared, but no significant difference was found. Therefore, despite the increase in friendships, this finding shows the students are not connecting with more peers that make them feel important. This finding indicates that this critical relationship is not growing within the community, and intervention should be considered.

The ego networks of the validation networks were then explored to find how the relationship changed at personal network level. The mean ego network densities at the start and end of the term were compared using *t* tests. There was no significant change in the mean ego network densities for the validation relationships. To state alternatively, on average, those validated by the actor did not begin to validate one another. And thus, there no change in the constraints on residents' ties during the semester.

Longitudinal egonet analysis detailed how each of the residents' validation relationships changed during their first semester. On average, residents validated 3.31 additional peers by the end of the semester, stopped validating 1.64 peers, and never validated 50.90 of their peers. Once again, residents did not form a supportive relationship with a large majority of their peers. The Prime Scholars administrators may want to use this information to develop programming that reinforces that each student is important to the community, as the residents are limited in whom they choose the validate.

The change in the ego network homophily toward scholarship status was explored for validation relationships. Students on average were somewhat homophilous at the start and

the end of the semester. When the mean Yule's Q were compared, there was a statistically significant reduction in the homophily measure. Thus, the RLC residents lessened their tendency to only validate those of the same scholarship status.

The betweenness centrality measures of the validation networks were then compared to find possible areas of change. At the start of the semester, "Dany" was the most central resident because many peers validated her. At the end of the semester, "Alerie" was the most central, also because many peers validated her. A *t* test found that the mean centrality did significantly increase during the term; thus, residents became more central in this network on average. These results showed that the residents, on average, became more powerful in the exchange of validation with the RLC. This is a positive finding, given that the community aims to increase their students' involvement in supporting others.

Academic assistance networks. Having someone to help with coursework has been connected to increased first-generation college persistence (Nicpon et al., 2006); therefore, academic assistance was included as a supportive relationship for this study. Sociograms for both the start and the end of the first term were generated to find how this relationship changes. The sociogram for the preexisting academic assistance network is shown in Figure 4.9. This map shows a more connected network, depicts the sparsest network yet, with a few intermittent ties scattered about a handful of people. This implies that, although students matriculated into the program with many people they knew previously, they consulted few of these peers for help, if any. The map of end-of-semester academic assistance network shows a much more cohesive network, with one large component rather than several scattered components. However, the network is not

very dense, and there are several individuals who did not give or receive help in coursework from any peer. This map implies that the RLC should investigate how to get residents to consult each other more for help with classwork, as there are visibly more opportunities for student to become better connected.

Change in the academic assistance networks was then explored by calculating and comparing the whole network densities and indegrees at both timepoints. The density was found to have a statistically significant increase at the end of the semester. Thus, academic assistance became more interconnected during the first term in the RLC. A *t* test comparison of the mean indegrees also found a significant increase, meaning that on average residents had more sources of academic help at the end of the term. These increases in academic assistance are promising because they mean that, throughout the network as a whole, academic assistance became more readily accessible. As college attrition is sometimes attributed to academic difficulties, this finding means that students are finding an important resource while living in the RLC.

The ego networks of the academic assistance networks were then examined for changes. As with the previously described support relationships, the mean ego network densities at the start and end of the term were compared using *t* tests, and there was a significant increase in the mean at the by the end of the term. On average, the residents' peers became more interconnected in their exchange of academic assistance. Those helped by an actor became to help each other. This is a positive finding because it indicates that if important information emerged, then the residents could spread the information more easily amongst those they assist with courses. Thus, by end of the first

term, the residents have a greater chance a finding help and receiving information about academics.

Longitudinal egonet analysis detailed how each of the residents' academic assistance relationships changed during their first semester. On average, residents assisted 1.46 additional peers by the end of the semester, stopped assisting only 0.14 peers, and never assisted 51.24 of their peers. Again, the number of students that were never assisted presents an opportunity for the RLC to develop means to get students to help each other with courses. Many students are not assisted during the term, and without intervention, this could be detrimental to their retention.

The change in the ego network homophily toward scholarship status was also investigated for the academic assistance networks relationships. A small negative mean Yule's Q for both timepoints indicated that residents on average had a very slight tendency to assist peers that were outside of their scholarship status. When the mean Yule's Q were compared, there was no statistically significant difference in homophily. The high achieving scholarship students may have been slightly inclined to help the non-scholarship students, and this pattern stuck through the semester.

The betweenness centrality measures of the academic assistance networks were then compared. The centrality scores at the start of the semester were very low, with "Elia" being the most central. At the end of the semester, "Shireen" was the most central, as she was assisted by and assisted many of her peer. A *t* test found that that the mean centrality did significantly increase during the term; thus, residents became more central in this network on average, and had more expansive relationships. This a positive finding, as it

implies that students have a variety of sources for assistance available to them by the end of the term.

Summary of change in supportive networks. Using SNA methods proved to be not only manageable, yielding responses from a population unfamiliar with survey research, but also productive as this pilot defined intangible supportive networks within the RLC in great detail. The methodology used here proved that these relationships existed within the community, and that they changed while the residents lived in the RLC. Furthermore, by specifying the social networks, this pilot revealed that much of the residents' support experienced only minor changes during the semester. Counter to what was anticipated, the residents did not experience a comprehensive increase in their support networks. Aside from academic assistance which became significantly denser during the term, largely due to its sparse start, the support networks did not become more cohesive. The changes in these support networks followed a trend of mildly positive improvements, if there were any changes at all. Although these results may be due to having a data from a single semester, one must keep in mind that the RLC spends considerable effort in building peer involvement amongst the residents during the first semester to avoid winter attrition. While this study documented added instances of encouragement, validation, and academic help, the community is not showing the significant rise in peer support that it may desire. For example, the residents do not extend any support to a large number of their peers, despite living in close quarters. Therefore, these results can profit the RLC by prompting interventions before the end of students' first year.

4) *How is participation in RLC programming and involvement in friendships and study partnerships associated with the supportive peer relationships at the end of the semester?*

Impact on encouraging relationships. When the end-of-semester encouragement network was tested, the variables included in the model explained about 28.0% of the variance. This is a noteworthy amount, but it shows that not everything tested in the model could explain residents' encouraging relationships. Of the variables tested, being of the same sex was found to have a significant relationship with encouraging ties, with more encouraging ties being observed if residents were of the same sex. This implies the students may have an easier time finding support amongst their peers of the same sex. Being friends at the end of the semester was also found to predict the number of encouraging relationships observed. Being study partners at the end of the semester had an even greater relationship with encouragement ties than friendship, possibly because study partners encourage peers through difficult assignments. Again, developing study partnerships appears to be an important factor in predicting peer involvement. The encouragement network established at the start of the semester also had the greatest significant influence in the model, which implies that many of the encouraging relationships students had at the start of the term carried to the end of the term.

To measure the impact of RLC participation, shared connected course enrollment and shared event participation were tested in the model. Being in the connected course together was found to not influence the encouragement ties observed. Event participation also had no significant impact. These findings imply that another assumption made at the start of this study was incorrect. Participation in the events and connected course

enrollment did not appear to meaningfully predict residents' encouragement ties. Friendships, study partnerships, and the preexisting encouraging relationships were the better predictors of this type of peer support.

Impact on validating relationships. When the end-of-semester validation network was tested, the variables included in the model explained about 22.0% of the variance. Although a notable amount, it shows that the model could not completely explain residents' validating relationships. Of the variables tested being friends at the end of the semester was found to be associated with the number of validating relationships observed. Being study partners at the end of the semester had the greatest influence in the model. The validation network established at the start of the semester had a significant relationship to end of semester network, which implies that many of the validating relationships from start of the term carried to the end of the term. However, the influence of who validated a resident at the start of the semester was less than that of who the resident studied with at the end of the semester.

Shared connected course enrollment and event participation were also tested in the model. Being in the connected course together was found to not influence the validating relationships observed. Event participation also had no significant relationship to the dependent variable. These findings imply that the conjecture from the start of this study was incorrect, and participation RLC activities did not appear to noticeably impact residents' validation. Friendships, study partnerships, and the preexisting validating relationships were the better predictors of this type of peer support.

Impact on academic assistance ties. When the end-of-semester academic assistance network was tested, the variables included in the model explained about 23.0% of the

variance. Of the variables tested, the difference in the number of non-RLC study partners was found to significantly influence academic assistance ties. This indicates that when one resident has more non-RLC study partners than another resident, there are slightly fewer observations of academic assistance between the residents. This implies that in the case of academic help, peer involvement outside of the RLC can influence the involvement within the RLC. Future studies of external peer involvement would likely provide valuable information to illuminate this relationship.

Being friends at the end of the semester was also found to increase the number of academic helping relationships observed, but the association was not as strong as that seen in the previous models. Being study partners at the end of the semester had the greatest positive influence on the academic assistance seen in the RLC. The academic assistance network established at the start of the semester had a significant positive association. However, the influence of this network was less than that of who the resident studied with at the end of the semester. Again, this implies that increasing the study partnerships within the RLC could greatly increase the residents' access to a supportive relationship. As surmised in the literature, any growth in academic assistance could greatly improve the odds of the RLC residents persisting to a degree (Nicpon et al., 2006; Pascarella et al., 2004; Whitt et al., 1999; Whitt et al., 2001).

Shared connected course enrollment and event participation were also tested in the model. Being in a connected course together was found to not influence the academic assistance observed. Shared event participation also did not have a significant relationship with the dependent variable. Again, these aspects of the RLC programming were not predictive of how the residents connect with one another.

Summary of the impact of participation and involvement on support networks. For the supportive relationships reported at the end of the semester, participation in the RLC had a mixed impact on how residents connected with one another. For encouraging relationships and validating relationships, connected course enrollment and event participation had no discernable influence on residents' ties. Again, this is concerning for the Prime Scholars community because the program intends for its activities to create a supportive network for students, which will then inspire them to stay in college. However, for the three supportive relationships that are presumed to stimulate college persistence (Cabrera, Stampen, & Hansen, 1990; Nora, 1987; Nicpon et al., 2006; Terenzini et al., 1994), the RLC's core efforts had no influence on the relationships observed. The activities of the RLC may require major revisions if they are to contribute to building a supportive environment. Peer involvement, however, did contribute to the supportive relationships observed in the community. Study partnerships had a particularly positive influence on residents' encouragement, validation, and assistance of one another. Given how supportive relationships build the resilience of first-generation students and motivate them toward degree completion (Nicpon et al., 2006; Stephens et al., 2014), Prime Scholars should not miss any opportunity to build the study partnerships amongst their residents because this form of peer involvement seems to be key to students developing beneficial connections.

Implications for Future Research

This study was intended to demonstrate how SNA methodologies can be used for socially-oriented evaluations of first-generation RLCs. A network survey was created specifically for the first-generation participants, with items relating to the types of social

involvement that the literature acknowledges as preventing attrition. The changes in the network were then tested to find how the students' participation in a first-generation exclusive community was associated with their peer involvement. The analytical results and the network characteristics show that SNA is a practical research tool that provides abundant information about the indistinct social aspects within a program, and requires little expenditure. This study implies that SNA, when grounded in student development theory, can be an advantageous addition to process or outcome evaluations of first-generation RLCs, which are growing in number, but face criticism. The methods used for this pilot could also be extended to the assessment of other first-generation difference-education resources in higher education, such as counseling programs.

Future researchers and evaluators could use and build upon several aspects of this study. First, this pilot explored change in the homophily by measuring students' tendency to form connections based on scholarship status. Measuring homophily, as demonstrated here, could be applied to many other characteristics of interest within a first-generation RLC. For example, future studies could find if changes in homophily occurred between residents of differing genders, races, achievement levels, or geographic origins. This would provide valuable information for communities concerned that their residents are split along certain lines. Second, the MR-QAPs displayed in this study included variables of importance specific to the administration of the Prime Scholars RLC. Future research could build on these MR-QAPs by including variables important to other communities. For example, participation in first-year experience programs, intermural teams, or orientation seminars may be used as independent variables for the dependent relationships of interest. Third, this study hints that participants' definitions of "friends"

and other relationships may vary throughout the term; hence, the number of endorsed relationships changed greatly for some residents. In the future research, interviews could be added to the methods discussed here. These interviews could ask students to define the boundaries of their relationships, which would enlighten how they identified their relationships. Such interviews have been performed in other studies (e.g. McCabe, 2016; Smith, 2010; Smith, 2015); however, this has not been done with a specific focus on first-generation students. These students may have different conceptualizations than continuing-generation students, and better understanding these differences could improve later network surveys. Finally, future studies could use the methods detailed here to develop a quasi-experimental design. The network measures and findings from a first-generation RLC could be compared to those of the first-generation population within a traditional residence hall acting as a control. With a comparison to a control group, researchers could determine the role of RLC programming with more certainty.

The results of this study are limited by the response rate for both baseline and the comparison network surveys. As SNA is intended to study whole populations, a response rate of 75% is the recommended minimum response rate to assure that the population is accurately characterized (Borgatti, Carley, & Krackhardt, 2006; Wasserman & Faust, 1994). The participants responded to the baseline and comparison surveys at a rate of 62.7% and 49.2%, respectively. This lower than expected response rate was like due to the online surveys being administered in a mannered outside of the protocol outlined in Chapter III. The issues caused by the missing responses were minimized by using responses from other respondents to fill in the missing vectors where appropriate, a technique common in social network research (Borgatti, Everett, & Johnson, 2013).

However, those replicating this pilot could likely have superior response rates by instructing the participants to voluntarily take the survey during a required program session, as was planned for this study.

A lack of participation data also limited this study. As mentioned in Chapter IV, the Prime Scholars community implemented a new online participation tracking system without notice, and transitioned from administration-recorded participation files to resident-recorded participation files. Unfortunately, there was little take-up with this new tracking system, and many of the residents never recorded the events they attended. Thus, missing information mired the collection of secondary data regarding residents' program participation. The MR-QAPs conducted may have had stronger results if more data had been available about residents' event attendance. It is recommended that researchers and evaluators avoid conducting similar studies while unproven tracking systems are being utilized, as this can negative affect the quality of secondary data. Or rather, future researchers should consider collecting their own participation data, either by including a participation scale into the comparison survey or by observing program events. Furthermore, future studies should consider frequent verifications and meetings with several members of the RLC administration to ensure that large operational shifts are not overlooked during the planning phases.

The possibility of commission error also limited the results of this study, particularly regarding the study partnership network. This dissertation explored the impact that commission error resulting from the respondent "Dany" would have had on detecting change in the study partnership network. Such an error may have affected the outcomes found by this study. However, without more information from the respondent,

there is no conclusive evidence that commission error occurred, or that "Dany's" responses were not reliable. Future studies would benefit from including qualitative elements, such as interviews, into their procedures so to address atypical survey responses with the study population. Interviews with participants could be used to verify or dismiss the information provided in the network surveys.

Another limitation of this study was the absence of social media, which could be addressed by future studies. This study took place in a geographical region were internet access is greatly limited, meaning that many of the incoming RLC residents likely did not have internet or computer resources before entering college. Thus, social media involvement was ignored due to the setting. Future studies in settings where internet access is abundant would benefit from including variables into the MR-QAP to account for following university-related social media accounts or "friending" peers. Adding a social media component to this methodology may help better our understanding of how electronic engagement influences peer involvement in first-generation RLCs.

Final Conclusions

Although the study found that peer involvement and supportive relationships did not change as anticipated during the first semester, this study did confirm that greater social involvement leads to improved social outcomes for first-generation students, as theorized by Astin (1999). Increased involvement in within-RLC friendships and study partnerships contributed to more supportive relationships within the community. Investigating the program through the lens of social network theory implied that the RLC's activities contributed little to the involvement and peer support of their residents. However, this perspective also provided information about the innerworkings of the peer

relationships, which allows the RLC to develop plans to better serve the first-generation population in the coming semester, as well as the cohorts in the coming years.

This methodological approach has great potential to improve the monitoring of programs targeted toward first-generation students. The sociograms, network measures, and other findings produced by this study show that examining a socially-oriented program from a social network perspective provides profuse information about the latent social processes within a first-generation community, far beyond what is provided by traditional evaluation methods alone. Incorporating such methodologies early into formative program monitoring could help first-generation programs recognize problems and intervene before these students begin to doubt their commitment to higher education. First-generation RLCs would no longer suffer a dearth of information when improving programming, but rather could use the network maps and measures to pinpoint the areas that require the most attention. Therefore, examining social involvement with SNA could help residential communities and universities build more supportive environments to foster college persistence.

Appendix A

Prime Scholars* Peer Involvement Survey (baseline)

Part 1

Directions: Please read the following questions carefully. For each question, check the box next to the name of any person who matches the description. If no one matches the description in the question, you do not have to check any of the names.

Who are your friends? (Check all that apply)					
☐ Student A	☐ Student H	☐ Student O	☐ Student W	☐ Student 4	☐ Student 11
☐ Student B	☐ Student I	☐ Student P	☐ Student X	☐ Student 5	☐ Student 12
☐ Student C	☐ Student J	☐ Student Q	☐ Student Y	☐ Student 6	☐ Student 13
☐ Student D	☐ Student K	☐ Student S	☐ Student Z	☐ Student 7	☐ Student 14
☐ Student E	☐ Student L	☐ Student T	☐ Student 1	☐ Student 8	☐ Student 15
☐ Student F	☐ Student M	☐ Student U	☐ Student 2	☐ Student 9	☐ Student 16
☐ Student G	☐ Student N	☐ Student V	☐ Student 3	☐ Student 10	☐ Student 17

Before college, who usually studied with you? (Check all that apply)					
☐ Student A	☐ Student H	☐ Student O	☐ Student W	☐ Student 4	☐ Student 11
☐ Student B	☐ Student I	☐ Student P	☐ Student X	☐ Student 5	☐ Student 12
☐ Student C	☐ Student J	☐ Student Q	☐ Student Y	☐ Student 6	☐ Student 13
☐ Student D	☐ Student K	☐ Student S	☐ Student Z	☐ Student 7	☐ Student 14
☐ Student E	☐ Student L	☐ Student T	☐ Student 1	☐ Student 8	☐ Student 15
☐ Student F	☐ Student M	☐ Student U	☐ Student 2	☐ Student 9	☐ Student 16
☐ Student G	☐ Student N	☐ Student V	☐ Student 3	☐ Student 10	☐ Student 17

[Continue to the next page]

* A pseudonym for the first-generation RLC participating in the study. The community's real name will appear on the survey.

Directions: Please read the following questions carefully. For each question, check the box next to the name of any person who matches the description. If no one matches the description in the question, you do not have to check any of the names.

Who has encouraged you to attended [institution name]? (Check all that apply.)					
□ Student A	□ Student H	□ Student O	□ Student W	□ Student 4	□ Student 11
□ Student B	□ Student I	□ Student P	□ Student X	□ Student 5	□ Student 12
□ Student C	□ Student J	□ Student Q	□ Student Y	□ Student 6	□ Student 13
□ Student D	□ Student K	□ Student S	□ Student Z	□ Student 7	□ Student 14
□ Student E	□ Student L	□ Student T	□ Student 1	□ Student 8	□ Student 15
□ Student F	□ Student M	□ Student U	□ Student 2	□ Student 9	□ Student 16
□ Student G	□ Student N	□ Student V	□ Student 3	□ Student 10	□ Student 17

Who has made you feel important at [institution name]? (Check all that apply.)					
□ Student A	□ Student H	□ Student O	□ Student W	□ Student 4	□ Student 11
□ Student B	□ Student I	□ Student P	□ Student X	□ Student 5	□ Student 12
□ Student C	□ Student J	□ Student Q	□ Student Y	□ Student 6	□ Student 13
□ Student D	□ Student K	□ Student S	□ Student Z	□ Student 7	□ Student 14
□ Student E	□ Student L	□ Student T	□ Student 1	□ Student 8	□ Student 15
□ Student F	□ Student M	□ Student U	□ Student 2	□ Student 9	□ Student 16
□ Student G	□ Student N	□ Student V	□ Student 3	□ Student 10	□ Student 17

When you had trouble with coursework before college, who typically helped you? (Check all that apply.)					
□ Student A	□ Student H	□ Student O	□ Student W	□ Student 4	□ Student 11
□ Student B	□ Student I	□ Student P	□ Student X	□ Student 5	□ Student 12
□ Student C	□ Student J	□ Student Q	□ Student Y	□ Student 6	□ Student 13
□ Student D	□ Student K	□ Student S	□ Student Z	□ Student 7	□ Student 14
□ Student E	□ Student L	□ Student T	□ Student 1	□ Student 8	□ Student 15
□ Student F	□ Student M	□ Student U	□ Student 2	□ Student 9	□ Student 16
□ Student G	□ Student N	□ Student V	□ Student 3	□ Student 10	□ Student 17

[Continue to the next page]

Part 2

Directions: For each of the following questions, provide the response that best describes you.

How many friends do you have at [institution] who DO NOT live in Prime Scholars?

_____

What is your major?

_____

Which of the following best describes you? Check all that apply.

- ☐ White
- ☐ Black/ African American
- ☐ Asian/ Asian American
- ☐ Hispanic
- ☐ Other:_____

What is your gender?

- ☐ Male
- ☐ Female

Are you a recipient of the Jacobsen Students* scholarship?

- ☐ Yes
- ☐ No

Thank you for your participation!

* Jacobsen Students is the pseudonym for the highly-selective need-based scholarship for high performing first-generation students. The real name of the scholarship will appear on the survey to students.

Prime Scholars* Peer Involvement Survey (comparison survey)

Part 1

Directions: Please read the following questions carefully. For each question, check the box next to the name of any person who matches the description. If no one matches the description in the question, you do not have to check any of the names.

Who are your friends? (Check all that apply)					
□ Student A	□ Student H	□ Student O	□ Student W	□ Student 4	□ Student 11
□ Student B	□ Student I	□ Student P	□ Student X	□ Student 5	□ Student 12
□ Student C	□ Student J	□ Student Q	□ Student Y	□ Student 6	□ Student 13
□ Student D	□ Student K	□ Student S	□ Student Z	□ Student 7	□ Student 14
□ Student E	□ Student L	□ Student T	□ Student 1	□ Student 8	□ Student 15
□ Student F	□ Student M	□ Student U	□ Student 2	□ Student 9	□ Student 16
□ Student G	□ Student N	□ Student V	□ Student 3	□ Student 10	□ Student 17

Who usually studies with you? (Check all that apply)					
□ Student A	□ Student H	□ Student O	□ Student W	□ Student 4	□ Student 11
□ Student B	□ Student I	□ Student P	□ Student X	□ Student 5	□ Student 12
□ Student C	□ Student J	□ Student Q	□ Student Y	□ Student 6	□ Student 13
□ Student D	□ Student K	□ Student S	□ Student Z	□ Student 7	□ Student 14
□ Student E	□ Student L	□ Student T	□ Student 1	□ Student 8	□ Student 15
□ Student F	□ Student M	□ Student U	□ Student 2	□ Student 9	□ Student 16
□ Student G	□ Student N	□ Student V	□ Student 3	□ Student 10	□ Student 17

[Continue to the next page]

* A pseudonym for the first-generation RLC participating in the study. The community's real name will appear on the survey.

Directions: Please read the following questions carefully. For each question, check the box next to the name of any person who matches the description. If no one matches the description in the question, you do not have to check any of the names.

Who encourages you to continue attending [institution name]? (Check all that apply.)					
□ Student A	□ Student H	□ Student O	□ Student W	□ Student 4	□ Student 11
□ Student B	□ Student I	□ Student P	□ Student X	□ Student 5	□ Student 12
□ Student C	□ Student J	□ Student Q	□ Student Y	□ Student 6	□ Student 13
□ Student D	□ Student K	□ Student S	□ Student Z	□ Student 7	□ Student 14
□ Student E	□ Student L	□ Student T	□ Student 1	□ Student 8	□ Student 15
□ Student F	□ Student M	□ Student U	□ Student 2	□ Student 9	□ Student 16
□ Student G	□ Student N	□ Student V	□ Student 3	□ Student 10	□ Student 17

Who makes you feel important at [institution name]? (Check all that apply.)					
□ Student A	□ Student H	□ Student O	□ Student W	□ Student 4	□ Student 11
□ Student B	□ Student I	□ Student P	□ Student X	□ Student 5	□ Student 12
□ Student C	□ Student J	□ Student Q	□ Student Y	□ Student 6	□ Student 13
□ Student D	□ Student K	□ Student S	□ Student Z	□ Student 7	□ Student 14
□ Student E	□ Student L	□ Student T	□ Student 1	□ Student 8	□ Student 15
□ Student F	□ Student M	□ Student U	□ Student 2	□ Student 9	□ Student 16
□ Student G	□ Student N	□ Student V	□ Student 3	□ Student 10	□ Student 17

When you have trouble with coursework, who typically helps you? (Check all that apply.)					
□ Student A	□ Student H	□ Student O	□ Student W	□ Student 4	□ Student 11
□ Student B	□ Student I	□ Student P	□ Student X	□ Student 5	□ Student 12
□ Student C	□ Student J	□ Student Q	□ Student Y	□ Student 6	□ Student 13
□ Student D	□ Student K	□ Student S	□ Student Z	□ Student 7	□ Student 14
□ Student E	□ Student L	□ Student T	□ Student 1	□ Student 8	□ Student 15
□ Student F	□ Student M	□ Student U	□ Student 2	□ Student 9	□ Student 16
□ Student G	□ Student N	□ Student V	□ Student 3	□ Student 10	□ Student 17

[Continue to the next page]

Part 2

Directions: For each of the following questions, provide the response that best describes you.

How many friends do you have at [institution] who DO NOT live in Prime Scholars?

_____

What is your major?

_____

Which of the following best describes you? Check all that apply.

- ☐ White
- ☐ Black/ African American
- ☐ Asian/ Asian American
- ☐ Hispanic
- ☐ Other:_____

What is your gender?

- ☐ Male
- ☐ Female

Are you a recipient of the Jacobsen Students* scholarship?

- ☐ Yes
- ☐ No

Thank you for your participation!

* Jacobsen Students is the pseudonym for the highly-selective need-based scholarship for high performing first-generation students. The real name of the scholarship will appear on the survey to students.

Appendix B

Betweenness Centrality Measures for Prime Scholars Residents

Table A.1

Betweenness Centrality Measures for the Friendship and Study Partnership Networks

Resident	Start-of-semester Friendship Betweenness	End-of-semester Friendship Betweenness	Start-of-semester Study Partnership Betweenness	End-of-semester Study Partnership Betweenness
Alerie	35.73	401.30	0	0
Amerei	0.72	13.30	0	0
Arya	28.26	2.04	0	0
Asha	60.42	9.84	0	0
Bella	0	7.53	0	0
Brandon	2.16	0.82	0	116.33
Brienne	0.06	0.39	32.00	0
Cat	8.97	2.04	0	0
Cersei	95.94	7.64	0	72.00
Cissy	3.10	0	0	0
Dany	78.30	136.07	495.33	38.43
Darlessa	74.01	66.57	0	5.13
Dorea	26.94	2.00	0	0
Elia	206.61	65.21	1.00	148.83
Genna	1.26	0.35	0	0
Gregor	0	0	0	0
Irri*	2.11	0		
Jacqen*	0	4.25	0	0
Jaime	106.30	3.08	0	116.33

Table continues

Table A.1 continued

Jhiqui	56.18	0	0	0
Joanna	71.71	0.04	0	0
Joy	0	0.53	0	0
Lancel	7.70	13.14	0	43.83
Leo	0.14	15.86	0	11.17
Lia	1.87	0	0	0
Loreza	0	0	0	0
Luthor	0.26	0.13	0	0
Lyarra	0.89	0	0	0
Lysa	169.68	31.36	0.33	290.75
Margaery	114.41	35.20	0	176.17
Martyn	27.76	22.68	0	5.80
Melisandre*	0	0		
Mya	2.75	3.06	0	0
Myrcella	2.82	4.03	0	0
Ned	135.70	1.36	0	36.10
Nymeria	1.95	0	0	0
Osha	0.08	1.73	0	0
Petyr	2.07	37.27	0	83.08
Podrick	0	0	0	0
Rhaelle	68.53	4.31	0	0.25
Rickard	10.40	1.35	0	1.50
Robb	0.25	0.13	0	0
Ronnel	0	0	0	0
Roslin	0.06	0.12	0	119.33

Table A.1 continues

Table A.1 continued

Saffron			35.58	11.50
Sandor	8.80	0.25	0	0
Sansa	8.40	1.60	0	0
Sarella	142.97	5.23	0	72.00
Selyse	0.61	10.22	0	37.00
Shireen	61.82	61.57	15.33	274.37
Stanis	128.93	0.39	0	0
Steffon	6.03	1.00	0	0
Tommen	24.21	85.16	0	315.20
Tyrion	2.77	0.67	0	126.63
Tywin	0.26	5.62	0	77.75
Varys	0.16	23.07	0	73.00
Walder	56.34	0	0	0
Willem	0	2.84	0	0
Ygritte*	0.	0.19		

Table A.2

Comparison of Start-of-semester and End-of-semester Centrality for Encouragement

Resident	Start of semester Betweenness	End of semester Betweenness
Alerie	0	330.08
Amerei	0	0
Arya	34.83	0
Asha	0	0.25
Bella	0	1.00
Brandon	0	0
Brienne	0	0
Cat	0	0

Table A.2 continues

Table A.2 continued

Cersei	0	0
Cissy	0	0
Dany	80.50	330
Darlessa	0	0.58
Dorea	0	0
Elia	31.00	79.82
Genna	0	4.83
Gregor	0	0
Irri	0	0
Jacqen	0	0
Jaime	20.67	0
Jhiqui	0	0
Joanna	0.50	0
Joy	0	0
Lancel	118.50	51.90
Leo	0	100.82
Lia	0	0
Lorenza	0	0
Luthor	0	0
Lyarra	1.67	8.13
Lysa	0	0
Margaery	0	50.05
Martyn	0	0
Mya	8.50	0
Myrcella	0	0
Ned	0	0
Nymeria	0	0
Osha	0	0
Petyr	0	44.00
Podrick	0	0
Rhaelle	0	1.72
Rickard	0	0
Robb	0	0
Ronnel	0	0
Roslin	0	0
Saffron	12.00	0
Sandor	0	0
Sansa	0	0
Sarella	0	0
Selyse	0	3.10
Shireen	37.83	33.40
Stanis	0	0
Steffon	0	0

Table A.2 continues

Table A.2 continued

Tommen	0	83.39
Tyrion	0	0
Tywin	0	17.19
Varys	0	6.72
Walder	0	0
Willem	0	0

Table A.3

Comparison of Start-of-semester and End-of-semester Centrality for Validation

Resident	Start-of-semester Betweenness	End-of-semester Betweenness
Alerie	0	323.85
Amerei	0	1
Arya	16.98	0
Asha	13	0
Bella	0	0
Brandon	0	0
Brienne	0	0
Cat	0	0
Cersei	0	111.42
Cissy	0	0
Dany	126.63	240.95
Darlessa	0	2.03
Dorea	0	0
Elia	25.36	48.80
Genna	0	0
Gregor	0	0
Irri	0	0
Jacqen	0	0
Jaime	25.79	0
Jhiqui	0	0
Joanna	2.17	0
Joy	0	4.67
Lancel	7.93	48.73
Leo	0	112.35

Table A.3 continues

Table A.3 continued

Lia	0	0
Lorenza	0	0
Luthor	0	0
Lyarra	0	4.23
Lysa	7.05	56.25
Margaery	0	108.33
Martyn	0	0
Mya	1.17	0
Myrcella	0	0
Ned	0	0
Nymeria	0	0
Osha	0	0
Petyr	0	59.23
Podrick	0	0
Rhaelle	2.93	109.32
Rickard	0	0
Robb	0	0
Ronnel	0	0
Roslin	0	0
Saffron	98.02	0
Sandor	0	0
Sansa	0	1.77
Sarella	12.17	0
Selyse	0	0
Shireen	108.81	38.53
Stanis	0	0
Steffon	0	0
Tommen	2	292
Tyrion	0	0
Tywin	0	2.33
Varys	0	29.23
Walder	0	0
Willem	0	0
Ygritte	0	0

Table A.4

Comparison of Start and End-of-semester Centrality for Academic Assistance

Resident	Start-of-semester Betweenness	End-of-semester Betweenness
Alerie	0	0
Amerei	0	0
Arya	0	1
Asha	1	14.5
Bella	0	0
Brandon	0	0
Brienne	0	0
Cat	0	0
Cersei	0	6
Cissy	0	0
Dany	0	0.25
Darlessa	0	1
Elia	2	14
Genna	0	0
Jacqen	0	0
Jaime	0	0
Jhiqui	0	0
Joanna	0	0
Joy	0	0
Lancel	0	14.75
Leo	0	0
Lia	0	0
Lorenza	0	0
Luthor	0	0
Lyarra	0	0
Lysa	0	0
Margaery	0	0
Martyn	0	0
Mya	0	0
Myrcella	0	0
Ned	0	0
Nymeria	0	0
Osha	0	0
Petyr	0	3

Table A.4 continues

Table A.4 continued

Podrick	0	0
Rhaelle	0	0
Rickard	0	0
Robb	0	0
Ronnel	0	0
Roslin	0	0
Saffron	0	0
Sandor	0	0
Sansa	0	0
Sarella	0	0
Selyse	0	4
Shireen	0	46.25
Stanis	0	0
Steffon	0	0
Tommen	0	32.25
Tyrion	0	0
Tywin	0	0
Varys	0	0
Walder	0	0
Willem	0	0

References

Adler, P. S., & Kwon, S. W. (2002). Social capital: Prospects for a new concept. *Academy of Management Review*, *27*, 17-40.

Akers, K. S. (2011). Connections, Paths, and Explanations- A Social Network Approach to Investigating Experiences of Experiences of Early Childhood Special Education with the ECLS-K (Doctoral dissertation). University of Kentucky: Lexington, KY

Antonio, A. L. (2004). The influence of friendship groups on intellectual self-confidence and educational aspirations in college. *Journal of Higher Education*, *75*(4), 446-471.

Armstrong, E. A., & Hamilton, L. T. (2013). *Paying for the Party*. Cambridge, MA: Harvard University Press.

Astin, A. W. (1975). *Preventing Students from Dropping Out*. San Francisco: Jossey Bass.

Astin, A. W. (1999). Student involvement: A developmental theory for higher education. *Journal of College Student Development*, *40*, 518-529.

Bank, B. J., Slavings, R. L., & Biddle, B. J. (1990). Effects of peer, faculty, and parental influences on students' persistence. *Sociology of Education*, 208-225.

Barry, L. M., Hudley, C., Kelly, M., & Cho, S. J. (2009). Differences in self-reported disclosure of college experiences by first-generation college student status. *Adolescence*, *44*(173), 55.

Beachboard, M. R., Beachboard, J. C., Li, W., & Adkison, S. R. (2011). Cohorts and

relatedness: Self-determination theory as an explanation of how learning communities affect educational outcomes. *Research in Higher Education*, *52*(8), 853-874.

Bean, J. P. (1980). Dropouts and turnover: The synthesis and test of a causal model of student attrition. *Research in Higher Education*, *12*(2), 155-187.

Bean, J. P. (1982). Conceptual models of student attrition: How theory can help the institutional researcher. *New Directions for Institutional Research*, *36*, 17-33.

Bean, J. P., & Metzner, B. S. (1985). A conceptual model of nontraditional undergraduate student attrition. *Review of Educational Research*, *55*, 485-540.

Belenky, M., Clinchy, B. M., Goldberger, N. R., & Tarule, J. (1986*). Women's Ways of Knowing: The Development of Self, Mind, and Voice*. New York, NY: Basic Books.

Berger, J. B., & Lyon, S. C. (2005). Past to present: A historical look at retention. In A. Seidman (Ed.), *College student retention: Formula for student success* (pp. 1-30). Westport, CT: Praeger Publishers.

Borgatti, S. P., Everett, M. P. & Johnson, J. C. (2013). *Analyzing Social Networks*. Los Angeles, CA: Sage.

Borgatti, S. P., & Halgin, D. S. (2011). On network theory. *Organization Science*, *22*(5), 1168-1181.

Borgatti, S. P., Carley, K. M. & Krackhardt, D. (2006). On the robustness of centrality measures under conditions of imperfect data. *Social Networks*, *28*, 124-136.

Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of Theory*

and Research for the Sociology of Education (pp. 241–258). New York, NY: Greenwood Press

Bowen, W. G., Chingos, M. M., & McPherson, M. S. (2009). *Crossing the Finish Line: Completing College at America's Public Universities*. Princeton, NJ: Princeton University Press.

Bradbury, B. L., & Mather, P. C. (2009). The integration of first-year, first-generation college students from Ohio Appalachia. *NASPA Journal*,*46*(2), 258-281.

Burt, R. E. (1992) *Structural Holes.* Cambridge, MA: Harvard University Press.

Cabrera, A. F., Nora, A. & Castaneda, M. B. (1993). College persistence: Structural equations modeling test of an integrated model of student retention. *Journal of Higher Education*, *64*(2), 123-139.

Cabrera, A. F., Stampen, J. O., & Hansen, W. L. (1990). Exploring the effects of ability to pay on persistence in college. *The Review of Higher Education*, *13*(3), 303-336.

Cacioppo, J. T. et al. (2000). Lonely traits and concomitant physiological processes: the MacArthur social neuroscience studies. *International Journal of Psychophysiology*, *35*(2), 143-154.

Calvó-Armengol, A., & Patacchini, E. (2009). Peer effects and social networks in education. *Review of Economic Studies*, *76*, 1239-1267.

Chen, X., & Carroll, C. D. (2005). *First-generation Students in Postsecondary Education: A Look at Their College Transcripts* (NCES 2005-171). Washington, DC: U. S. Department of Education, National Center for Education Statistics, U.S. Government Printing Office. Retrieved from http://nces.ed.gov/pubs2005/2005171.pdf

Choy, S. (2001). *Students Whose Parents Did Not Go to College: Postsecondary Access, Persistence, and Attainment* (NCES Rep. No. 2001-126). Washington, DC: National Center for Educational Statistics.

Collier, P. J., & Morgan, D. L. (2008). "Is that paper really due today?": differences in first-generation and traditional college students' understandings of faculty expectations. *Higher Education*, *55*(4), 425-446.

Daly, A. J. (2010). *Social Network Theory and Educational Change*. Cambridge, MA: Harvard Education Press.

de Laat, M., Lally, V., Lipponen, L., & Simons, R. J. (2007). Investigating patterns of interaction in networked learning and computer-supported collaborative learning: A role for Social Network Analysis. *International Journal of Computer-Supported Collaborative Learning*, *2*, 87-103.

Demetriou, C., & Schmitz-Sciborski, A. (2011). Integration, motivation, strengths and optimism: Retention theories past, present and future. In *Proceedings of the 7th National Symposium on Student Retention*, Charleston, SC (pp. 300-312).

Fischer, M. J. (2007). Settling into campus life: Differences by race/ethnicity in college involvement and outcomes. *The Journal of Higher Education*, *78*(2), 125-156.

Frazier, W., & Eighmy, M. (2012). Themed residential learning communities: The importance of purposeful faculty and staff involvement and student engagement. *Journal of College and University Student Housing*, *38*(2), 10-31.

Freeman, L. C., Roeder, D., & Mulholland, R. R. (1979). Centrality in social networks: II. Experimental results. *Social networks*, *2*(2), 119-141.

Garriott, P., Hudyma, A., Keene, C., & Santiago, D. (2011). Social cognitive predictors

of first- and non-first-generation college students' academic and life satisfaction. *Journal of Counseling Psychology*, *62*, 253-263.

Gofen, A. (2009). Family capital: How first-generation higher education students break the intergenerational cycle. *Family Relations*, *58*, 104-120.

Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, *78*, 1360-1380.

Gurin, P., & Nagda, B. R. A. (2006). Getting to the what, how, and why of diversity on campus. *Educational Researcher*, *35*, 20-24.

Gurin, P., Nagda, B. A., & Zúñiga, X. (2013). *Engaging Race and Gender: Intergroup Dialogues in Higher Education.* New York, NY: Russell Sage Foundation.

Hertel, J. B. (2002). College student generational status: Similarities, differences, and factors in college adjustment. *Psychological Record*, *52*, 3–18.

Horn, L., & Nuñez, A. M. (2000). *Mapping the Road to College First-Generation Students' Math Track, Planning Strategies, and Context of Support*. (NCES Rep. No. 2000-153). Washington, DC: National Center for Educational Statistics.

Inkelas, K. K., Vogt, K. E., Longerbeam, S. D., Owen, J., & Johnson, D. (2006). Measuring outcomes of living-learning programs: Examining college environments and student learning and development. *Journal of General Education*, *55*, 40-76.

Inkelas, K. K., Daver, Z. E., Vogt, K. E. & Leonard, J. B. (2007). Living-learning programs and first-generation college students' academic and social transition to college. *Research in Higher Education*, *48*, 403-434.

Inkelas, K. K., & Weisman, J. L. (2003). Different by design: An examination of student

outcomes among participants in three types of living-learning programs. *Journal of College Student Development*, *44*(3), 335-368.

Inman, W. E., & Mayes, L. (1999). The importance of being first: Unique characteristics of first-generation community college students. *Community College Review*, *26*(4), 3-22.

Ishitani, T. T. (2003). A longitudinal approach to assessing attrition behavior among first generation students: Time-varying effects of pre-college characteristics. *Research in Higher Education*, *44*, 433-449.

Ishitani, T. T. (2006). Studying attrition and degree completion behavior among first-generation college students in the United States. *Journal of Higher Education*, *77*, 861-885.

Johnson, J. L. (2000). Learning communities and special efforts in retention of university students: What works, what doesn't, and is the return worth the investment? *Journal of College Student Retention*, *2*, 219-238.

Kadushin, C. (2012). *Understanding social networks: Theories, concepts, and findings*. Oxford, UK: Oxford University Press.

Kezar, A. (2000). *Summer Bridge Programs: Supporting All Students*. *ERIC Digest*. (ED442421). Washington, DC: ERIC Clearinghouse.

Kuh, G. D., Schuh, J. H., Whitt, E. J. & Associate (1991). *Involving Colleges: Successful Approaches to Fostering Student Learning and Development Outside the Classroom.* San Francisco: Jossey-Bass.

Lin, N., Ensel, W. M., & Vaughn, J. C. (1981). Social resources and strength of ties:

Structural factors in occupational status attainment. *American Sociological Review*, 393-405.

Lohfink, M. M., & Paulsen, M. B. (2005). Comparing the determinants of persistence for first-generation and continuing-generation students. *Journal of College Student Development*, *46*(4), 409-428.

London, H.B. (1996). How college affects first generation students. *About Campus*, *1*, 9 13.

Longwell-Grice, R., & Longwell-Grice, H. (2007). Testing Tinto: How do retention theories work for first-generation, working-class students? *Journal of College Student Retention*, *9*¸ 407-420.

Lundberg, C. A., Schreiner, L. A., Hovaguimian, K., & Slavin-Miller, S. (2007). First-generation status and student race/ethnicity as distinct predictors of student involvement and learning. *NASPA Journal*, *44*, 57-83.

Mallinckrodt, B. (1988). Student retention, social support, and dropout intention: Comparison of Black and White students. *Journal of College Student Development*, *29*, 60-64.

Martinez, J. A., Sher, K. J., Krull, J. L., & Wood, P. K. (2009). Blue-collar scholars?: Mediators and moderators of university attrition in first-generation college students. *Journal of College Student Development*,*50*, 87-107.

McCabe, J. (2016). *Connecting in College: How Friendship Networks Matter for Academic and Social Success*. Chicago: University of Chicago Press.

McCarron, G. P., & Inkelas, K. K. (2006). The gap between educational aspirations and

attainment for first-generation college students and the role pf parental involvement. *Journal of College Student Development*, *47*, 534-539.

Mehta, S. S., Newbold, J. J., & O'Rourke, M. A. (2011). Why do first-generation students fail?. *College Student Journal*, *45*, 20-35.

Nicpon, M. F., Huser, L., Blanks, E. H., Sollenberger, S., Befort, C., & Kurpius, S. E. R. (2006). The relationship of loneliness and social support with college freshmen's academic performance and persistence. *Journal of College Student Retention: Research, Theory & Practice*, *8*(3), 345-358.

Nora, A. (1987). Determinants of retention among Chicano college students: A structural model. *Research in Higher Education*, *26*, 31-59.

Nora, A., Attinasi, L. C., & Matonak, A. (1990). Testing qualitative indicators of precollege factors in Tinto's attrition model: A community college student population. *The Review of Higher Education*, *13*(3), 337-355.

Nora, A., & Rendon, L. I. (1990). Determinants of predisposition to transfer among community college students: A structural model. *Research in Higher Education*, *31*(3), 235-255.

Nunez, A. M., & Cuccaro-Alamin, S. (1998). *First-Generation Students: Undergraduates Whose Parents Never Enrolled in Postsecondary Education.* Statistical Analysis Report. Postsecondary Education Descriptive Analysis Reports.

Okun, Benin, & Brandt-Williams, 1996 Okun, M. A., Benin, M., & Brandt-Williams, A. (1996). Staying in college: Moderators of the relation between intention and institutional departure. *The Journal of Higher Education*, 577-596.

Oliverez, P. M., & Tierney, W. G. (2005). *Show Us the Money: Low-Income Students,*

Families, and Financial Aid. Center for Higher Education Policy Analysis, University of Southern California.

Otte, E., & Rousseau, R. (2002). Social network analysis: a powerful strategy, also for the information sciences. *Journal of information Science*,*28*(6), 441-453.

Oyserman, D. & Destin, M. (2010). Identity-based motivation: Implications for intervention. The Counseling Psychologist, 38, 1001– 1043.

Pascarella, E. T., Pierson, C. T., Wolniak, G. C., & Terenzini, P. T. (2004). First generation college students: Additional evidence on college experiences and outcomes. *Journal of Higher Education*, 249-284.

Pascarella, E. T., & Terenzini, P. T. (2005). *How College Affects Students* (Vol. 2). K. A. Feldman (Ed.). San Francisco, CA: Jossey-Bass.

Pasque, P. A., & Murphy, R. (2005). The intersections of living-learning programs and social identity as factors of academic achievement and intellectual engagement. *Journal of College Student Development*, *46*(4), 429-441.

Petty, T. (2014). Motivating first-generation students to academic success and college completion. *College Student* Journal, 48(2), 257-264.

Phinney, J. S., & Haas, K. (2003). The process of coping among ethnic minority first-generation college freshmen: A narrative approach. *The Journal of social psychology*, *143*(6), 707-726.

Phinney, J. S., Dennis, J. M., & Chuateco, L. I. (2005). The role of motivation, parental support, and peer support in the academic success of ethnic minority first-generation college students. *Journal of College Student Development*, *46*(3), 223-236.

Pike, G. R. (1999). The effects of residential learning communities and traditional residential living arrangements on educational gains during the first year of college. *Journal of College Student Development*, *40*, 269-284.

Pike, G. R. (2008). Assessment matters: Learning about learning communities: Consider the variables. *About Campus*, *13*(5), 30-32.

Pike, G. R., & Kuh, G. D. (2005). First-and second-generation college students: A comparison of their engagement and intellectual development. *Journal of Higher Education*, 276-300.

Pressman et al. (2005). Loneliness, social network size, aand immune response to influenza vaccination in college freshmen. *Health Psychology*, *24*, 297-306.

Purdie, J. R., & Rosser, V. J. (2011). Examining the academic performance and retention of first year students in living-learning communities and first-year experience courses. *College Student Affairs Journal*, *29*(2), 95-112.

Raisman, N. (2013). The cost of college attrition at four-year colleges and universities. The Educational Policy Institute. Retrieved from website: http://www. educationalpolicy. org/pdf/1302_PolicyPerspectives. pdf

Rendon, L. I. (1992). From the barrio to the academy: Revelations of a Mexican American "scholarship girl". *New Directions for Community Colleges*, *80*, 55-64.

Richardson, R. C., & Skinner, E. F. (1992). Helping first-generation minority students achieve degrees. *New directions for community colleges*, *80*, 29-43.

Ryan, J. F. (2004). The relationship between institutional expenditures and degree attainment at baccalaureate colleges. *Research in Higher Education*,*45*(2), 97-114.

Saenz, V. B., Ngai, H. N., & Hurtado, S. (2007). Factors influencing positive interactions across race for African American, Asian American, Latino, and White college students. *Research in Higher Education*, *48*(1), 1-38.

Sarason, B. R., Sarason, I. G., & Pierce, G. R. (1990). *Social support: An interactional view*. Hoboken, NJ: Wiley & Sons.

Schein, H. K. (2005). The zen of unit one: Residential learning communities can foster liberal learning at large universities. *New Directions for Teaching and Learning*, *103*, 73-88.

Scott, J. (2013). *Social Network Analysis* (3rd ed.). Los Angeles, CA: Sage.

Serrat, O. (2009). *Social network analysis*. Washington, DC: Asian Development Bank.

Shields, N. (2001). Stress, active coping, and academic performance among persisting and nonpersisting college students. *Journal of Applied Biobehavioral Research*, *6*(2), 65-81.

Smith, R. A. (2010). "Only connect." A mixed methods study of how first-year students create residential academic and social networks. Graduate School of Syracuse, Syracuse, NY.

Smith, R. A. (2015). "Magnets and seekers: A network perspective on academic integration inside two residential communities." *Journal of Higher Education*, *86*(6):893-922.

Stassen, M. L. (2003). Student outcomes: The impact of varying living-learning community models. *Research in Higher Education*, *44*, 581-613.

Stephens, N. M., Hamedani, M. G., & Destin, M. (2014). Closing the social-class

achievement gap a difference-education intervention improves first-generation students' academic performance and all students' college transition. *Psychological science*, *25*(4), 943-953.

Stephens, N. M., Fryberg, S. A., Markus, H. R., Johnson, C. S., & Covarrubias, R. (2012). Unseen disadvantage: how American universities' focus on independence undermines the academic performance of first-generation college students. *Journal of personality and social psychology*, *102*(6), 1178.

Strauss, L. C., & Volkwein, J. F. (2004). Predictors of student commitment at two-year and four-year institutions. *Journal of Higher Education*, 203-227.

Stuber, J. M. (2011). Integrated, marginal, and resilient: race, class, and the diverse experiences of white first-generation college students. *International Journal of Qualitative Studies in Education*, *24*(1), 117-136.

Thayer, P. (2000). Retention of students from first-generation and low-income backgrounds. *Journal of the Council for Opportunity in Education,* Washington, DC.

Thelin, J. R. (2011). *A History of American Higher Education* (2nd ed.). Baltimore: Johns Hopkins University Press.

Thomas, S. L. (2000). Ties the bind: A social network approach to understanding student integration and persistence. *Journal of Higher Education*, *71*, 591-615.

Terenzini, P. T., Springer, L., Yaeger, P. M., Pascarella, E. T., & Nora, A. (1996). First generation college students: Characteristics, experiences, and cognitive development. *Research in Higher Education*, *37*, 1-22.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent

research. *Review of Educational Research*, *45*(1), 89-125.

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. University of Chicago Press, 5801 S. Ellis Avenue, Chicago, IL 60637.

Tinto, V. (2006). Research and practice of student retention: What next? *Journal of College Student Retention*, *8*, 1-19.

Tinto, V., & Russo, P. (1994). Coordinated Studies Programs: Their Effect on Student Involvement at a Community College. *Community college review*, *22*(2), 16-25.

Vargas, J.H. (2004). *College Knowledge; Addressing Information Barriers to College*. Boston, MA: The Education Resources Institute (TERI).

Volle, K., and A. Federico. (1997). *Missed Opportunities: A New Look at Disadvantaged College Aspirants*. The Education Resources Institute and the Institute for Higher Education Policy.

Wang, C. C. D., & Castañeda-Sound, C. (2008). The Role of generational status, self-esteem, academic self-efficacy, and perceived social support in college students' psychological well-being. *Journal of College Counseling*, *11*(2), 101-118.

Wasserman, S., & Faust, K. (1994). *Social Network Analysis: Methods and Applications* (Vol. 8). Cambridge: Cambridge University Press.

Wawrzynski, M. R., & Jessup-Anger, J. E. (2010). From expectations to experiences: Using a structural typology to understand first-year student outcomes in academically based living-learning communities. *Journal of College Student Development*, *51*(2), 201-217.

Wellman, B., & Berkowitz, S. D. (1988). *Social Structures: A Network Approach* (Vol. 2). CUP Archive.

Whitt, E., Edison, M., Pascarella, E., Nora, A., & Terenzini, P. (1999). Interaction with peers and objective and self-reported cognitive outcomes across three years of college. *Journal of College Student Development*, *40*, 61–78.

Whitt, E., Edison, M., Pascarella, E., Terenzini, P., & Nora, A. (2001). Influences on students' openness to diversity and challenge in the second and third years of college. *Journal of Higher Education*, *71*, 172–204.

Woosley, S. A. (2003). How important are the first few weeks of college? The long term effects of initial college experiences. *College Student Journal*, *37*(2), 201-208.

Woosley, S. A., & Miller, A. L. (2009). Integration and institutional commitment as predictors of college student transition: Are third week indicators significant?. *College Student Journal*, *43*(4), 1260.

Woosley, S. A., & Shepler, D. K. (2011). Understanding the early integration experiences of first-generation college students. *College Student Journal*, *45*, 700-714.

Wottenberg, L. N. (2014). Relationships & capital in living learning communities: A social network analysis (Doctoral dissertation). University of Kentucky, Lexington, KY.

York-Anderson, D. C., & Bowman, S. L. (1991). Assessing the college knowledge of first-generation and second-generation college students. *Journal of College Student Development*, *32*(2), 116-122.

Curriculum Vitae

R. Renee Setari

EDUCATION

Doctor of Education (Expected)	EDUCATIONAL POLICY STUDIES, MEASUREMENT, AND EVALUATION University of Kentucky, College of Education Lexington, Kentucky Dissertation: *Support Networks of "Educational Pioneers": A Methodological Approach for Examining the Impact of Residential Learning Communities on First-generation Students*
Master of Science	FAMILY SCIENCES University of Kentucky, Dept. of Family Sciences Lexington, Kentucky May 2014
Graduate Certificate	WOMEN AND GENDER STUDIES University of Kentucky, Dept. of Women and Gender Studies Lexington, Kentucky May 2014
Bachelor of Arts	ENGLISH LITERATURE Georgia Southern University, Dept. of English Statesboro, Georgia May 2009

PROFESSIONAL EXPERIENCE

Graduate Research and Evaluation Assistant

The UK Evaluation Center- Dept. of Educational Policy Studies & Evaluation
University of Kentucky
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August 2015 – Present

Graduate Research Assistant
To Joseph Ferrare, Ph. D.- Associate Professor- Dept. of Educational Policy Studies & Evaluation
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Teaching Assistant
For Mathematics- UK Academic Enhancement
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August 2014 – December 2014

Graduate Research Assistant
To Robert Flashman, Ph. D.- Professor- Dept. of Family Sciences, UK Extension
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June 2012 – May 2014

PUBLICATIONS

Peer Reviewed Journal Articles

Lee, J. & **Setari, R. R.** (2017). The impact of employment on college student satisfaction and retention. *Journal of Student Affairs*, 26: 57-68.

Ferrare, J. J. & **Setari, R.R**. (Working paper, 2016). Converging on choice: The inter-state flow of foundation dollars to charter school organizations. National Center for the Study of Privatization in Education (NCSPE).

Setari, A. P., & **Setari, R. R.** (2016). Trends in Catholic school minority enrollment and higher education entrance over the recession. *Journal of Catholic Education*, 19(3). http:// dx.doi.org/10.15365/joce.1903022016

Manuscripts in Review

Ferrare, J. J. & **Setari, R.R.** (2017). Converging on Choice: The Inter-State Flow of Foundation Dollars to Charter School Organizations.

PRESENTATIONS

Setari, R. R., Sampson, S., Bradley, K., & Stanek, M. (2017, April). Revision of the Kentucky Statewide Victimization Survey. Poster accepted for presented at the 2017 American Educational Research Association's Annual Meeting for Survey Research SIG. San Antonio, TX.

Setari, R. R. (2016, April). Network Analysis of Private Foundations' Convergent Funding of Higher Education. Poster presented at the 2016 American Educational Research Association's Annual Meeting for Division D In-progress Research Gala. Washington, DC.

Ferrare, J. J. & **Setari, R. R.** (2016, April). Flocking Around the Facts? Measuring the Impact of Evidence on Philanthropic Convergence in Charter School Reform. Paper presented at the 2016 American Educational Research Association's Annual Meeting for Division L- Educational Policies and Politics- Section 4: School Choice and Market Reforms. Washington, DC.

Setari, R. R., Liu, R., Stanek, M., & Bradley, K. (2015, November). The Development of the Kentucky Victimization Survey: A Discussion of the Challenges and Process. Paper presented at the 2015 Mid- western Educational Research Conference. Evanston, IL.

Setari, A., & **Setari, R. R.** (2013, November). Rasch analysis of a financial literacy

measurement tool. Poster presented at the 2013 Association for Financial Counseling and Planning Education Annual Research and Training Symposium. Greenville, SC.

AWARDS

John Edwin Partington and Gwendolyn Gray Partington Scholarship (2015) - University of Kentucky, College of Education

University Honors Program Scholarship (2006-2009) – Georgia Southern University, University Honors Program

Outstanding Graduating Senior Award (Spring 2009) – Georgia Southern University, College of Liberal Arts and Social Sciences

Woody Powell Scholarship (Fall 2008) – Georgia Southern University, Dept. of English

GSU President's List (2007- 2009) – Georgia Southern University